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September 14th, 1946
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Washington Highlights

Petroleum's situation at Washington continues more or less tranquil.

The changes in stripper oil well subsidies was anticipated and occasioned no surprise. Economic Stabilizer John R. Steelman announced that the revised plan for payment of stripper subsidies, effective as of August 1, cut payments in various pools by 25 cents, the amount by which stripper well producers have benefited by price increases since crude oil was removed from price control.

He explained that where premium payments were 35 cents under the old plan, the maximum has been reduced to 10 cents. Subsidy payments for most stripper production under price control had ranged from 20 to 35 cents above ceiling prices. The reduction will save the Government about $2,500,000 a month.

Expectations are that the Real Property Disposal Board of the War Assets Administration will soon act on the 16 bids from the Big and Little Inch pipelines, which ranged from $70,000,000 to $135,000,000. A number of the offers are from organizations seeking to use the lines to carry oil, rather than gas.

Undersecretary of State Acheson disclosed at a news conference that the United States favors exploring possibility of a global agreement on oil. The Government long has advocated the desirability of a multilateral oil agreement.

In addition, he stated, the United States would also like to debate the organization of an international oil body under the United Nations economic and social council.

At the behest of the monopoly subcommittee of the House Small Business Committee, the Commerce Department plans a detailed survey of service station operations throughout the country. The study will take into consideration new stations, those that went out of business and transfers of stations during the fighting years and postwar period. The survey also is likely to appraise bulk plant distribution to retailers.

Two former aides of the Chester Bowles OPA control organization have resigned from the five member staff of the recently created OPA decontrol board.

Harold Leventhal, formerly assistant to OPA General Counsel Field under the Bowles rule, and serving the decontrol board as adviser to General Counsel David Cobb, has returned to private law practice.

Bice Clemow, former assistant to OPA administrator when Bowles was chief, resigned as acting secretary of the decontrol board. He was replaced by Marvin A. Brooker.

Remaining with the board are three Bowles assistants. They are: David Cobb, General Counsel, formerly assistant to General Counsel Field under Bowles; Walter Salant, economic adviser to the decontrol board, who was former chief of the Price and Policy Division of the OPA during the Bowles regime, and Delmar Beman, information director for the decontrol board. He was formerly a member of the editorial section, OPA trade relations division of OPA as directed by Bowles.

Exemption of natural gas and petroleum gas from price control along with other petroleum products under the new act was formally announced by OPA.

Fading out of the Washington scene are two important oil committees. One is the special petroleum investigating body headed by Joseph O'Mahoney and the House subcommittee on petroleum. Their demise is due to the new legislative reorganization act.

Army induction centers have opened their doors, after the July-August draft holiday. Most of the September draftees are the 19-year-olds, lowest age group under the new induction regulations.

A limited number of key workers in essential reconversion and transportation industries probably will be certified for occupational deferment from selective service by the Civilian Production Administration. Basis for such certification is likely to include tetraethyl lead, asphalt and tarred roofing products, natural and butyl rubber and industrial alcohols.

The September draft will take but few from the 20 through 25-year classes, due to previous and depleting draft calls on these age categories. The number from the 26

(Continued on Page 40)

Looking Around

By THE OBSERVER

WHEN STANDARD OILERS TURN MIDNIGHT-OILERS

Bill Ackers (anyway we'll call him that), a graduate of University of Wisconsin, came to Standard of California in '38.

His career as a junior engineer with us was interrupted in '41. Bill became assistant engineering officer of a destroyer . . . then engineering officer of a destroyer-minesweeper.

His war tasks done — and how! — Bill returned to us in January '46. And in March, in line with our policy of granting leaves of absence for educational purposes and under the provisions of the G. I. Bill of Rights, we said a temporary so-long to Bill again so that he might enter California Institute of Technology and take some advanced mechanical engineering.

Then there is Tom Bailey (another real guy, though that's not his name), who joined us in '39 as a helper in the machine shops at El Segundo.

In '43 Tom entered the Air Corps . . . piloted a B-24 in the heavy bombings of Luzon . . . completed 40 missions with honor . . . and was back with us in July, '45.

Tom had had no previous college training. In October of '45 he took his leave of absence and is working for a degree in chemical and mechanical engineering at University of Washington. He plans to work for us as usual during summer vacations.

We're glad to see ambitious young fellows of this company make all they can of themselves. To our scores of Standard Oilers turned burners of the midnight oil, we say, "So-long now, and later a hearty welcome back!"

Listen to "The Standard Hour" Sunday evenings, now at 7:30 over N.B.C. Stations.

STANDARD OF CALIFORNIA

Corrosion of Wells in Distillate Fields

Approximately one hundred distillate fields are now operating in the United States and, although a few of these fields are over ten years old, the majority have been brought in during the last six or seven years. As far as the oil operator is concerned, distillate well corrosion is therefore a development of the last few years.

The seriousness of the problem should not be underestimated. It presents a continual hazard to the operation of certain distillate fields and is one that may cost the petroleum industry many millions of dollars before proper relief is obtained. The removal of tubing strings and well head fittings alone has probably amounted to over $1,000,000 during the last year. It was approximately $400,000 in one field. Additional drilling programs, necessitated by the elimination of dual completions in some of the distillate fields, will cost several millions of dollars. High pressure distillate well corrosion has a pronounced effect upon the economic production of certain fields.

Fields that were originally believed to be non-corrosive are continually being found to be corrosive. Many wells producing in corrosive fields that have been regarded as free from corrosive attack are, on closer inspection, being found to be otherwise. Whereas it appeared for some time that all the corrosive action in a tubing string concentrated itself near the well head, it is now known that the corrosive action may take place over the entire length of the string. Whereas it also appeared for some time that the corrosive action in flow lines occurred near the producing well, it is now known that serious corrosion may take place throughout the entire field gathering system. Every new development in this respect should be an impetus toward increased effort in the solution of the corrosion problem.

A careful study indicates that over two-thirds of the producing distillate fields in the U.S. are corrosive. Paloma is listed as a corrosive field; while Coles Levee is believed to be non-corrosive at present.

It is estimated that over $1,000,000 was spent in 1945 for the renewal of tubing strings and well head fittings. Almost $400,000 was spent in one field alone.

The American Petroleum Institute and the Natural Gasoline Association of America are conducting intensive studies to ascertain the cause of this type of corrosion, and the nature of effective corrective measures.

This paper is a condensation of a report presented by F. S. West, chairman of the A.P.I. Committee on the Corrosion of High Pressure Production Equipment. It was read before the Spring Meeting of the Southwestern District A.P.I. Division of Production, Shreveport, Louisiana, May 17-18, 1946.

CALIFORNIA OIL WORLD believes that California operators will find this condensation to be of unusual practical interest.

Two-thirds of Distillate Fields Corrosive

It appears safe to say that over two-thirds of all of the present producing distillate fields are corrosive. About one-third of the corrosive fields are seriously corrosive and about two-thirds are moderately or only slightly corrosive. (Paloma has been listed as corrosive; while Coles Levee is considered non-corrosive. . . . Ed.) Fields considered seriously corrosive are those in which tubing strings, tree fittings, or flow lines receive sufficient corrosive action to necessitate their renewal in the order of once a year.

The actual cause of the distillate well corrosion is still unknown. Very little information as to materials, either metallic or otherwise, that will effectively resist the cor-

Characteristic of the distillate field is this view of the Paloma area in the San Joaquin Valley. One hundred distillate fields are now producing in the United States.

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rosion and that are suitable for well use in other respects is available. Even though the injection into wells of certain neutralizers or inhibitors has met with reasonable success, so far no generalized procedure of injection applicable to all fields has been developed.

Characteristics of the Corrosion

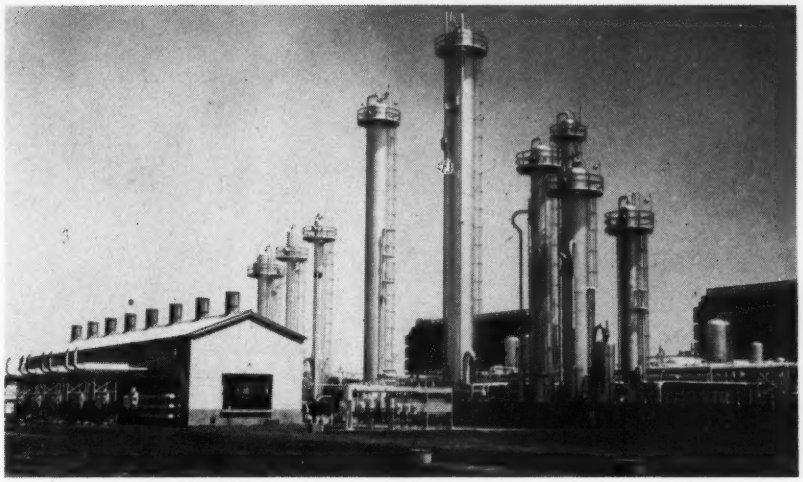
Perhaps the first and most important factor in regard to high pressure distillate well corrosion is where and to what extent the actual corrosion occurs.

As a rule, the well tubing receives the greatest amount of attack, but this is not always the case. The tubing corrosion seems to generally concentrate itself around the joints, but in some cases the action has spread itself over comparatively large areas.

It appears that usually the attack starts through the formation of small pits and these pits apparently grow in diameter and combine with other pits so that often large internal areas of the tubing are somewhat uniformly corroded away. Many tubing strings have been pulled during the last couple of years to find that in certain locations the tubing wall has been decreased to an unsafe thickness. This extreme corrosion often takes place in a few months time. Tubing corrosion is generally the greatest near the surface of the well. It is not, however, limited to this location as some tubing strings have evidenced corrosion over their entire length of 10,000 feet or more. In such cases, the corrosive action increases in intensity from the bottom of the well to the top. As previously stated, the corrosive action generally occurs in the form of pits and in some cases to an extent of eating the entire surface away. On the other hand, the corrosive action often takes on peculiar shapes such as that of forming almost perfectly shaped rings around the tubing wall, or that of corroding long longitudinal valleys in the tubing, or that of forming small continuous worm-eaten cuts.

Well-head Fittings Corroded

In general, the extent of corrosion that has been found on the distillate well tree and tree fittings is less than that found in the tubing; but many wells have shown serious corrosion of these materials, especially in pipe nipples attached to the tree fittings, metallic ring gaskets, valve trims, etc. The well choke often receives the greatest amount of corrosion of all the well materials, but this is undoubtedly due to a combination of corrosive action and erosive action instead of corrosion alone.



Few cases of corrosion attributable to produced gas have been reported as taking place in cycling plant equipment. There is, however, no reason to believe that cycling plant equipment is immune from such corrosion, but the extent should be less severe.

Extreme corrosion has frequently been found in the meter run and flow lines downstream of the well choke. In a few cases, the entire length of a flow line from the producing well to the cycling plant has had to be renewed because of corrosion. This phase of production equipment has to date had the least in the way of proper inspection and many more such flow line replacements will undoubtedly have to be made in the near future.

Few, if any, serious cases of this type of corrosion have been reported as taking place in the cycling plant equipment. There is, however, no reason to believe that the cycling plant equipment, especially that equipment handling the produced well liquids, is immune from such corrosion, even though it is logical to believe that the action should be less severe within the plant than at the well.

Results of Research and Field Test Work

Even though the research and field test work has been going on for a period of over two years and some gratifying progress has been made, the problem is far from being solved. There has, however, been some important information obtained and, although this information is tentative and in many respects inconclusive, much of it is of value to the operator who is active in the field of distillate well corrosion. The highlights of the information and some tentative conclusions follow:

1. The majority of the distillate-producing fields are to some degree corrosive. More thorough inspection of the wells in some of the fields now reported as non-corrosive will show these fields to be corrosive.

2. Generally, when one well producing from a specific formation in a distillate field shows evidence of corrosion, the majority of all of the wells producing from that same formation in the same field will show evidence of corrosion. This, however, is not always the case.

3. If the fluid produced from one formation in a specific distillate field is found to be corrosive, it does not necessarily indicate that the fluid produced from any other formation in the field will be corrosive.

4. The fluid produced from the deeper distillate sands is more apt

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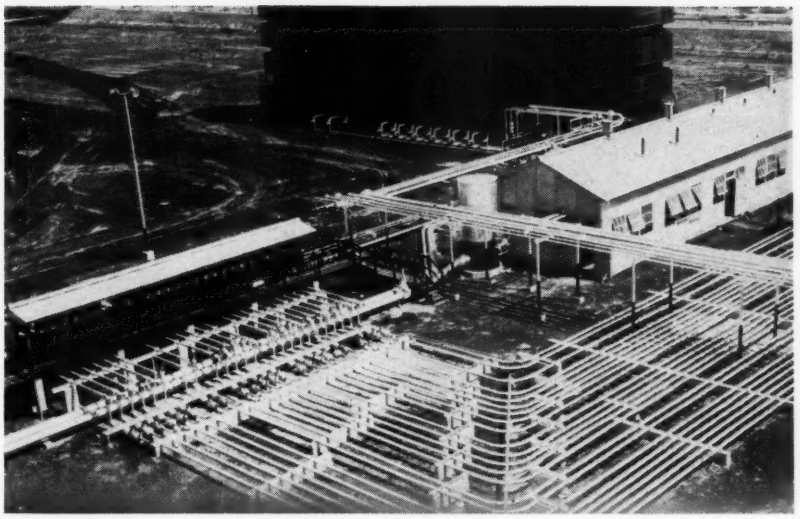
to be corrosive than that produced from shallower sands.

Role Played by Acids

5. The corrosive action is most likely caused by carbonic acid or by certain organic acids or a combination of both. Laboratory investigations carried on by the Bureau of Mines and by the Battelle Institute have indicated that the action of carbonic acid alone on steel coupons under conditions comparable to well head conditions is sufficient to cause the corrosion that takes place in the average corrosive distillate well. The laboratory investigations have also shown that the rate of corrosive attack is increased by the addition of amounts of organic acids comparable to the amounts found in produced distillate well waters. The most predominant organic acids found in the well waters are acetic, propionic and formic. The results of these tests plus the fact that most other possible causative agents have in one manner or another been ruled out are the principal reasons to conclude that the distillate well corrosion is an acid corrosion and probably caused by either carbonic acid or certain organic acids, or a combination of both.

6. Even though evidence points toward the fact that the corrosive action in distillate wells is caused by either carbonic or some organic acid, the presence of considerable amounts of one or both of these acids in produced well waters does not necessarily mean that the produced waters will be corrosive. This is the case in several non-corrosive fields and it may be assumed that in such cases some inhibitive agent is present in the produced well fluid which creates a protective film over the metallic surface thereby preventing corrosion. One phase of the research work sponsored by the Natural Gasoline Association of America and carried on at the University of Texas is the investigation of surface films formed on steel coupons exposed to the produced waters from a number of distillate wells. In this work some marked differences have been found in the characteristics of surface films formed by waters from corrosive wells and characteristics of surface films formed by waters from non-corrosive wells. These differences may be caused by the presence of some naturally occurring inhibitor in the non-corrosive well water and its absence in the corrosive well water.



In a few cases, the entire length of a flow line from the producing well to the cycling plant has had to be renewed because of corrosion. What eventually happens to cycling plant piping systems remains to be determined.

Water Acidity Not Correlated With Corrosion

These factors all lead to the general conclusion that the amount of carbon dioxide produced with the well gas or the relative acidity of the produced well water either because of the presence of carbonic acids or organic acids can not be directly correlated with the extent of the well corrosion. Tests made on the well water for acid content or for pH value therefore have little significance, at least at the present time, as inhibitors of corrosion.

7. The corrosive action on distillate well tubing is generally the greatest near the well head, diminishing in extent from there down. This is naturally to be expected since the condensation of water vapor increases as the well fluid rises toward the surface of the ground. The amount of acid present is in turn a direct function of the amount of water formed. Hence the greatest amount of tubing corrosion near the surface.

8. Increased turbulence of the flowing well fluid will generally increase its corrosive action. This is to be expected as corrosive action is almost always accelerated if the products of corrosion are more effectively removed from the surface under attack. This is one possible explanation, although not conclusive by any means, as to why corrosion in the well tubing generally concentrates itself around the joints. It is undoubtedly the explanation as to why the distillate well choke is exceptionally vulnerabe to corrosive attack.

Metallurgical Indications

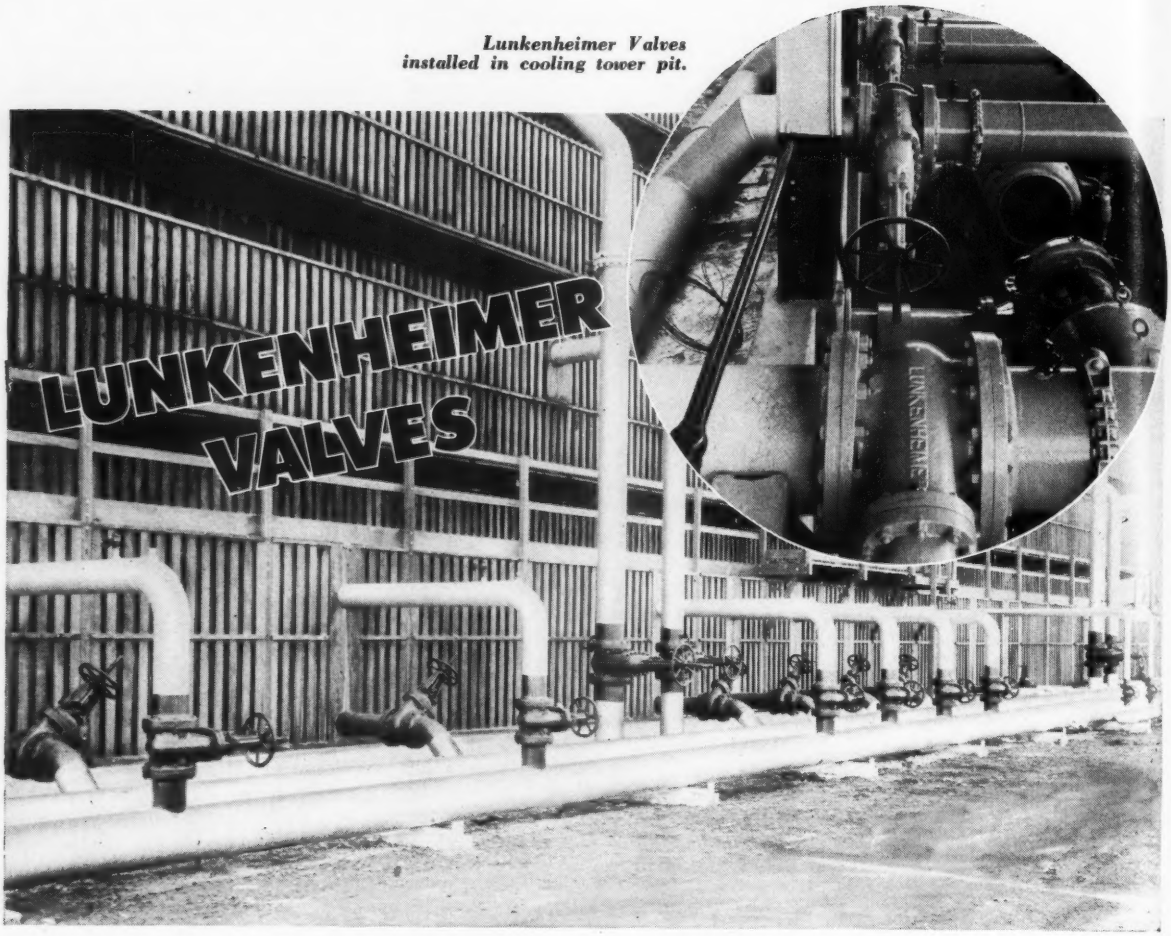
9. Tubing and well fittings made of high carbon steels are more subject to the corrosive action than those made of low carbon steels. N-80 tubing is therefore less resistant to corrosion than J-55.

10. There is no substantial evidence so far to indicate that normalized tubing is more resistant to corrosive attack than non-normalized tubing.

11. Low nickel content, chrome or copper-bearing steels are no more resistant to distillate well corrosion than mild carbon steels. On the other hand, high content nickel or chrome steels, 10% or more, appear to be reasonably resistant to the corrosion.

12. Certain copper alloys, such as monel and bronze also appear to be reasonably resistant to distillate well corrosion.

Lunkenheimer Valves installed in cooling tower pit.



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	Corrosive Fields			Non-Corrosive Fields		
	Maximum	Minimum	Average	Maximum	Minimum	Average
Well depth, in feet	13,200	4,050	8,077	7,200	2,197	4,840
Reservoir temperature, °F.	250°	157°	207°	190°	76°	142°
Reservoir pressure, psi	5,000	1,330	3,243	3,200	400	1,619
Wellhead temperature °F.	170°	100°	134°	130°	72°	95°
Wellhead pressure, psi	4,000	1,110	2,454	2,640	250	1,198
Production rate, millions cu. ft./day	30	2.5	9.7	10	0.7	4.3
Distillate content, bbls./million cu. ft.	70	2.5	27.8	26	0	8.2
Water content, bbls./million cu. ft.	3.7	0.4	1.17	34	0	6.6
CO_2, % by vol.	2.0	0.6	0.87	0.7	0	0.35
H_2S in grains/100 cu. ft.	0.08	0.0	0.001	0.2	0	0.05
pH	6.5	4.5	5.4	7.2	4.1	5.8
Hydroxide alkalinity as $CaCO_3$ p.p.m.	0	0	0	0	0	0
Carbonate alkalinity as $CaCO_3$ p.p.m.	448	20	148	692	8	121
Total solids, p.p.m.	74,400	242	11,600	186,400	152	36,000
Chloride in p.p.m.	39,200	0	5,780	95,500	0	18,100
Sulfate in p.p.m.	104	0	21	70	8.5	29.9
Iron oxide in p.p.m.	1,280	160	439	441	57	185
Organic acids in p.p.m.	812	49	222	405	0	156

A tabulation of some results obtained by the NGAA water survey in distillate fields. This table is not a part of the context.

Paint or Plastic Coatings

13. In general, little satisfaction to date has been obtained from the use of either painted or plastic type coatings on tubing or well head fittings as a means of resisting distillate well corrosion. Any coating of this type in order to be effective in this respect must, first, be capable of withstanding considerable erosive action without wear; second, be capable of withstanding the normal handling necessary for setting and pulling of the tubing without damage; third, be capable of withstanding the running of tools or instruments through the tubing in place without damage; and fourth, be resistant to the absorption of gases as any coating material that will absorb the produced gas when operating under high pressures will be damaged with a sudden decrease in operating pressure.

Chemical Treatments

14. Certain inhibitors, especially sodium chromate and sodium dichromate, are being injected into the bottom of the corrosive wells in some of the distillate fields as a means of preventing or materially reducing the amount of corrosion. This procedure, even though still in its experimental stage, has met with reasonable success.

15. Certain neutralizers, especially ammonium hydroxide, are being injected into the bottom of the corrosive wells in some distillate fields as a means of preventing or materially reducing the amount of corrosion. This procedure has also met with reasonable success.

Testing and Measuring

16. Mild steel coupons installed in the flow stream at or near the well head of a producing distillate well will give to some degree the extent of the corrosiveness of the well fluid. These coupons must be well cleaned and weighed before inserting into the line and again after removing from the line so as to accurately determine the metal weight-loss. The test period may vary in length from a few days to several weeks.

17. The tubing caliper has proven to be a valuable instrument in determining the internal condition, from a corrosion standpoint, of the distillate well tubing.

18. The iron content of the water produced in a distillate well can not as a rule be used as a direct means of judging the extent of well corrosion, but changes in iron content can generally be closely correlated with changes in amount of corrosion. Determination of the iron content of the produced water is therefore a valuable test if used in conjunction with the injection of a neutralizer or inhibitor.

19. Corrosive distillate wells should be produced only through the tubing. Dual completions should therefore be avoided. In fact, it would probably be good practice to make no dual completions in any field except after such a field has been proven to be non-corrosive.

Kern Bluff Well Rigging

A trio of exploratory ventures sponsored by Standard Oil Co. in San Joaquin Valley are making progress in one way or another toward their respective goals. No. 72-29 in Sec. 29-29s-29e in the Kern Bluff area is rigging up. W. P. No. 46-33w in Sec. 33-29s-21e in the Sheep Springs area is spot coring brown shale at 5948 ft. Jewett Comm. No. 4 in Sec. 16-31s-29e in the Mountain View area is reaming at 6565 ft.

Round Mountain Locations Staked

Location for two more drilling jobs on wildcat ground in the Round Mountain area have been staked. Rothschild Oil Co. will drill Alma No. 1 in Sec. 15-28s-28e. Pacific Gulf Oil Co. is ready to start work on Karpe No. 1 in Sec. 30-28s-29e.

The Petrol Corp. has plugged bottom of its K.C.L.-Claire No. 4 in Sec. 13-28s-28e with cement and sand and is testing water shut off at 2344 ft. Original bottom is 2375 ft.

Rincon Try Grades Roads

Roads are being graded for Honolulu Oil Corp., Honolulu-Signal-Bates No. 1 in Sec. 36-4n-25w in the Rincon area of Ventura County. Elevation is 1125 ft.

Triunfo Try Wall Samples

Following an electric log run, Bennett Exploration Co. is sidewall sampling with its Triunfo No. 2 in Sec. 24-1n-19w in the Triunfo area. Bottom is 3100 ft.

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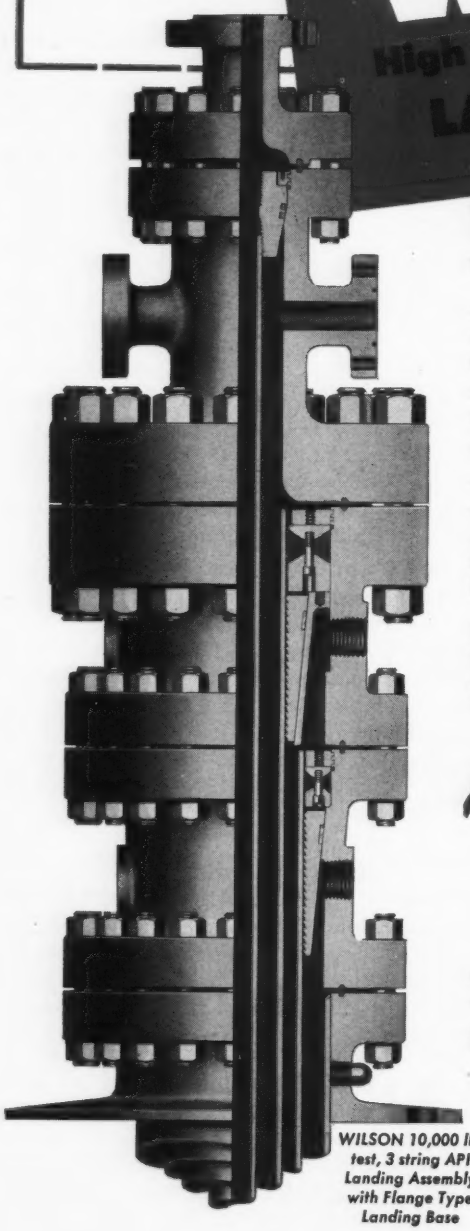

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A Resume of the Development of Thermofor Catalytic Cracking

By D. M. Luntz and E. A. White,
Houdry Process Corp.

As a means of establishing well-balanced refinery operations and assuring the maximum return from crude oil, it is important to convert petroleum stocks into the maximum yields of gasoline and light fuels and to minimize production of heavy fuels. Over a period of years, such processes as thermal visbreaking and coking of heavy residual stocks were developed to augment thermal cracking of distillate oils for the production of motor gasoline. The octane numbers of the gasolines produced from the predominantly practiced thermal operations were usually in the range of 60 to 70 CFR-M, unleaded.

Catalytic cracking processes, which have been installed in the United States during recent years to the extent of about 1,100,000 BPD of charge capacity, serve to improve the gasoline to fuel oil balance to a marked degree because they produce high yields of high quality gasoline (78 to 82 CFR-M, unleaded) with principally light distillate fuel as a by-product rather than heavy residual fuel such as is produced in conventional thermal cracking operations. The improved octane number yield relationship is illustrated graphically in Figure I which compares the overall refinery gasoline yield-octane number relationships for thermal and catalytic cracking. While the positions of the curves will change to a certain degree depending on the crude being run, which fractions are cracked and the particular types of cracking employed, it is apparent that there is a very substantial advantage in overall gasoline yield and/or octane rating when cracking catalytically.

All of the present catalytic cracking processes employ the same fundamental principle of catalytic processing. A solid catalyst is contacted with oil under elevated temperature conditions, causing the decomposition and molecular rearrangement of the oil with the simultaneous deposition of carbonaceous material on the catalyst. This deposit, which greatly reduces the catalyst activity and requires removal to restore the catalyst to practically its initial level of activity, is burned off by combustion with air. Continuous use of the catalyst at elevated temperatures and exposure to process steam and other deleterious compounds cause it slowly to lose activity, and the catalyst must be replaced, either continuously or periodically. The principal variables by which the catalytic cracking reaction is controlled by most operators are: type and activity of catalyst, temperature, catalyst residence time, space velocity*, and oil partial pressure

In Houdry Fixed-Bed cracking, the first commercial catalytic cracking process, the catalyst (pelleted type) is contained in a static bed in a reaction chamber and the oil vapors are passed over it. Regeneration is practiced in situ by burning with air and temperature control is realized by circulating molten salt in tubes through the catalyst bed. Continuous operation is obtained by employing three or more catalyst "cases," which operate in cycles.

In Thermofor catalytic cracking (commonly referred to as TCC), the catalyst (granular or pelleted type) flows in a steady stream through a reactor and the oil vapors are contacted with it. From the reactor the spent catalyst is transferred continuously to a regenerator where the carbonaceous and other combustible materials are burned off. This trans-

*Volume of cold oil per hour per volume of catalyst in reactor.

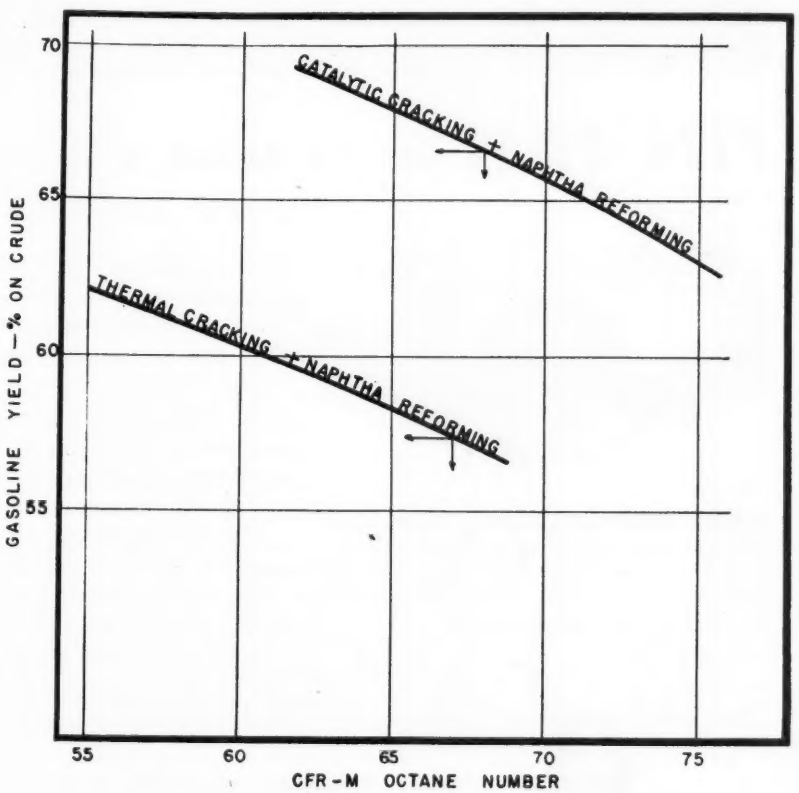
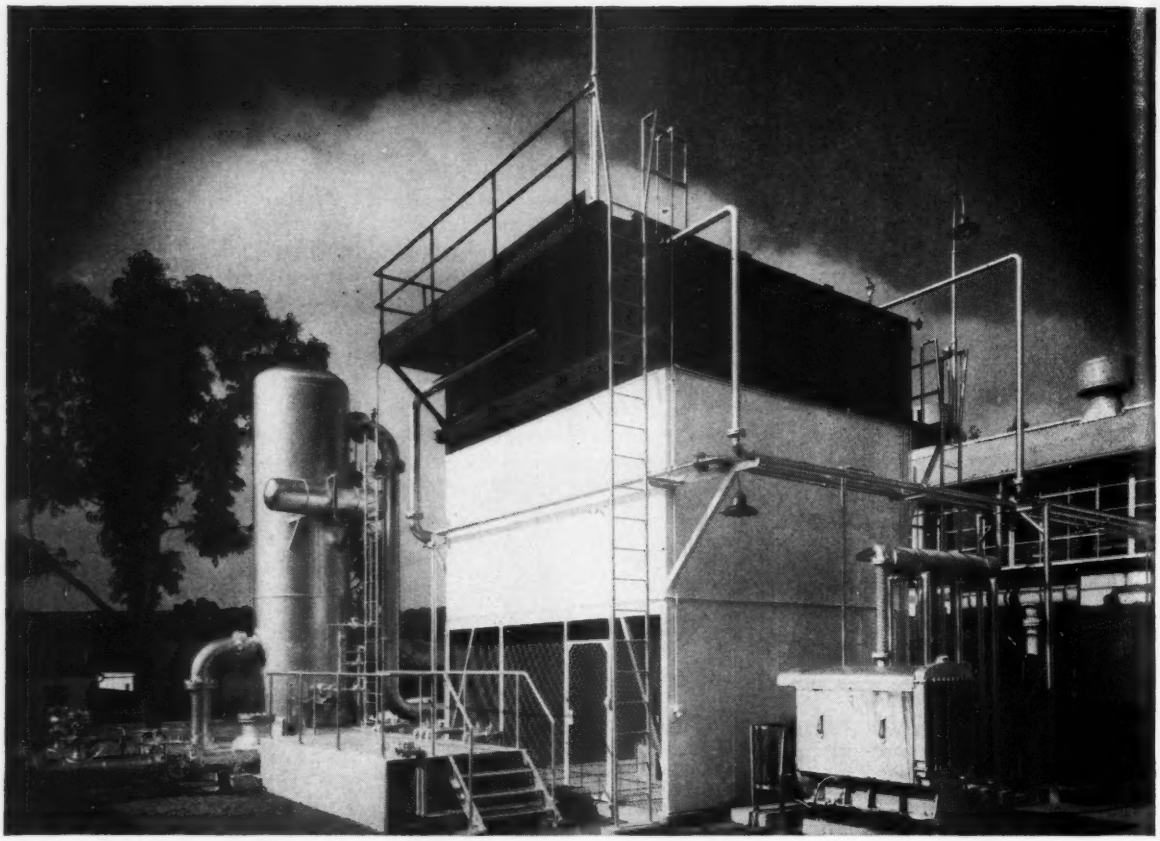


FIGURE I
COMPARISON OF THERMAL AND CATALYTIC CRACKING
GASOLINE YIELD VS OCTANE NUMBER



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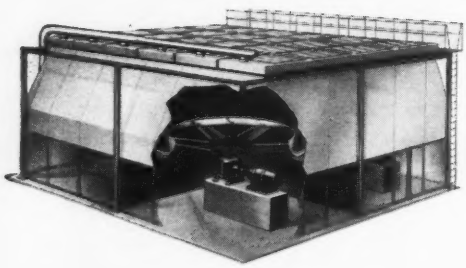

FLUOR FIN·FAN Cooling Unit consists of finned tubes over which air is circulated by variable pitch fans. ★ FIN·FAN Cooling Units are manufactured and sold by: The Griscom-Russell Co. and The Fluor Corporation, Ltd.

The versatility of the FLUOR FIN·FAN Cooling Unit is clearly demonstrated by the installation pictured above. This FIN·FAN Cooling Unit is installed in one of the compressor plants of a West Coast Natural Gas Company, adjoining a residential area.

Rigid building restrictions limited the height of the structure to 25 feet and prohibited any cooling water spray or condensation being permitted to pass over adjacent homes and buildings. In addition, the Gas Company required a unit which would perform a triple cooling job: 1. jacket water; 2. oil; 3. gas.

The FLUOR FIN·FAN Cooling Unit not only met all building requirements but it renders the triple service specified.

The FIN·FAN Cooling Unit operates efficiently on building tops or at ground level, and it can be applied to a wide range of condensing and cooling services. Investigate the FIN·FAN Unit—it may be the answer to your cooling problem. Write today for the Fluor General Catalog No. 46.

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fer of catalyst from the reactor to regenerator and back to the reactor is accomplished by means of continuous bucket type elevators.

Both the Houdry and TCC processes are licensed by the Houdry Process Corporation, New York Office, 115 Broadway, New York. This paper traces the development of the TCC process and describes its salient features.

Starting about 1923, Eugene Houdry pioneered the field of catalytic cracking. Assisted by the Socony-Vacuum and Sun Oil Companies, he and his associates developed the art of catalytic cracking to the commercial stage as represented by the Houdry Fixed-Bed catalytic cracking process. The first commercial Houdry unit was placed in operation in 1936. The background and "know how" represented by this group plus further intensive development work brought the TCC catalytic process to commercial status.

The TCC process derives its name from the Thermofor type of clay burning kiln which is employed as the catalyst regenerating unit. The first commercial installation of the Thermofor kiln (for regeneration of spent granular clays from lube oil plants) was placed in operation in 1939 and gave excellent performance as a clay revivifier. Prior to that time, work on continuous catalytic cracking embodying the broad principles of the TCC process had been well advanced. The need for an efficient catalyst regeneration unit had been appreciated fully and led to the adaptation and further development of the Thermofor kiln as an integral part of the TCC process.

The large scale development work on TCC was conducted in a semi-commercial unit having a reactor charge capacity of approximately 500 BPD. This unit was operated for about two years for a study of the variables of the process and development of improved equipment.

Figure II, which shows schematically the essentials of present-day TCC design can be used to follow the flow through the original 500 BPD unit. In this unit, catalyst of negligible carbon content was fed into the top of the reactor from a hopper and flowed downward countercurrent to the oil vapors which were introduced at the bottom of the reaction zone. The cracked vapors

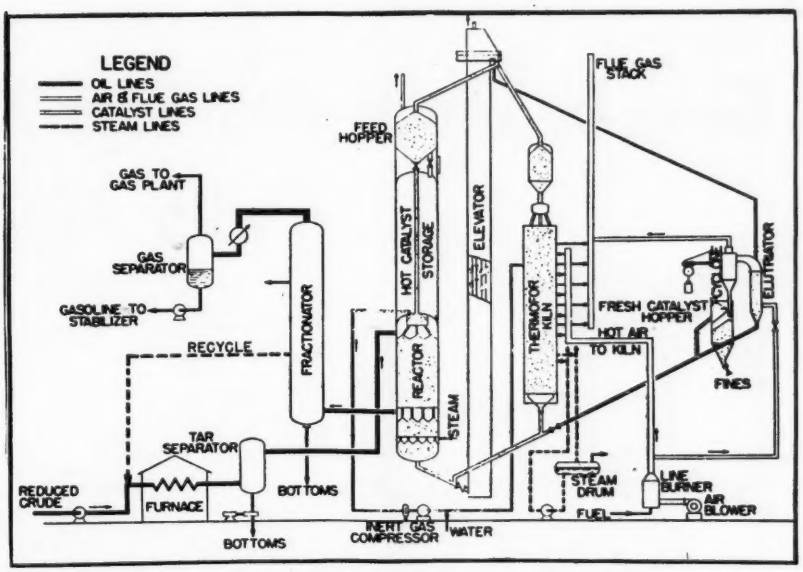

FIG. 2 SIMPLIFIED FLOW DIAGRAM OF TYPICAL TCC INSTALLATIONS, CATALYTIC SECTION

were collected at the top of the catalyst bed and sent to a product recovery section similar to those associated with thermal cracking units. After leaving the reaction zone, the spent catalyst flowed through a purge zone where superheated steam was used to strip out the small amount of oil vapors carried by the catalyst. Then, the catalyst was lifted by a bucket elevator to a hopper at the top of the Thermofor kiln through which it also passed downward by gravity flow. In the kiln, the carbonaceous and other deposits on the catalyst were burned off with air and the carbon content of the catalyst was reduced to the low level required to maintain the catalytic activity. The cycle was completed by returning the regenerated catalyst in another bucket elevator to a hopper located above the reactor.

The catalyst was fed into the reactor through an elongated feed pipe used to supply the head needed to overcome the reactor pressure. (The pressure carried on the reactor is dictated by the pressure drop through the product recovery system and is usually about 7 to 11 psi gage). To prevent the escape of oil vapors up the feed pipe to the atmosphere, a flow of inert gas was maintained into the top of the reactor below the clay feed pipe. This inert gas seals off the oil vapors from contact with air.

The reactor itself was a cylindrical vessel containing in the reaction zone angular iron baffles (stacked in layers) which provided intimate contact between the oil vapors and catalyst without impeding catalyst flow. Uniform distribution of the oil vapors at the lower portion of the reactor was assured by the use of a distribution grid similar to the one shown in Figure III, consisting of inverted channels connected to an inlet duct.

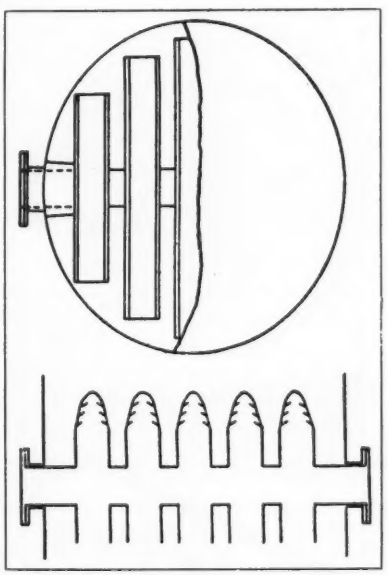

Fig. 3—Schematic sketch of the oil feed grid used in the T.C.C. countercurrent reactor, which consists of inverted channels connected to an inlet duct.

Louvres in the channel permit the incoming oil vapors to pass out and around the downward flowing catalyst.

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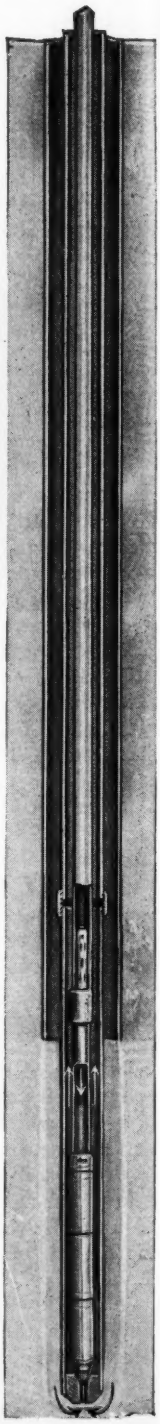

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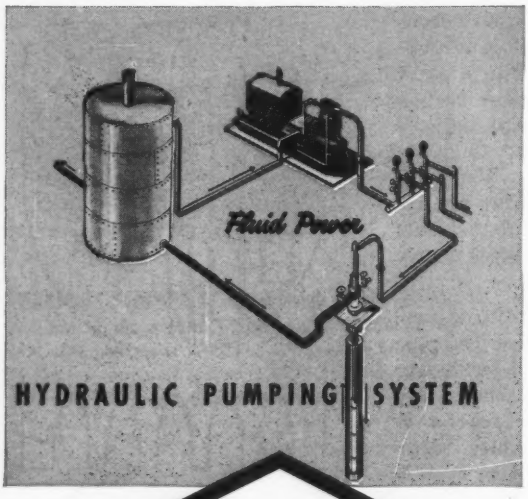

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The purge zone, which is directly below the reaction zone, was also fitted with baffling and a similar distribution grid for the introduction of steam. Stripping is accomplished by desorbing liquid oil from the catalyst, by reducing the oil partial pressure in the purge zone with steam, and by displacing oil vapors from the voids around the catalyst particles.

Catalyst flow control is realized by the system shown in Figure IV, which combines the advantage of having a single catalyst drawoff line to the elevator with multiple drawoffs from the reactor bed itself, assuring uniform flow over the entire cross section of the reactor.

The Thermofor kiln as originally designed for the regeneration of percolation clay used in lube oil treating processes was filled with spiral-finned tubes running the length of the vessel and through which molten salt was circulated as a cooling medium. Air was introduced at the bottom of the kiln and the products of combustion removed at the top, so that combustion and cooling were conducted simultaneously throughout the vessel. In the interests of operating simplicity, lowered investment cost, and better-controlled burning, this arrangement was changed to provide alternate burning and cooling zones when the kiln was adapted to the Thermofor catalytic cracking process.

In the modified design the same spiral-finned tubes were used to carry the cooling medium but they were grouped in stages and installed in a horizontal position. Water was used as the cooling medium instead of molten salt as before. The air was introduced and flue gas collected in inverted channels, the alternate layers of air and flue gas channels being staggered to give efficient air-catalyst contact. Vertical tubes supported the channels and acted as manifolds, one inch holes being drilled in the tubes just below the channel tops. Maximum length of path for the air was fifteen inches, either up or down, to the adjacent collector channels.

Zone regeneration, as practiced in the TCC process, greatly reduces the rate of decline of catalyst activity by minimizing the catalyst deactivation effects of steam, SO_2, etc., at elevated temperatures and also the harmful effect of elevated temperatures, per se. Thus, removal of sulfur compounds, steam and other deleterious compounds is accomplished in the top zones of the kiln at the mildest temperature conditions; and, throughout the kiln, catalyst temperature is controlled within close limits by the arrangement of alternate burning and cooling zones. Figure V shows a typical temperature gradient through the kiln. The specific influence of catalyst activity on product distribution is illustrated and discussed later in this article, in connection with Table V.

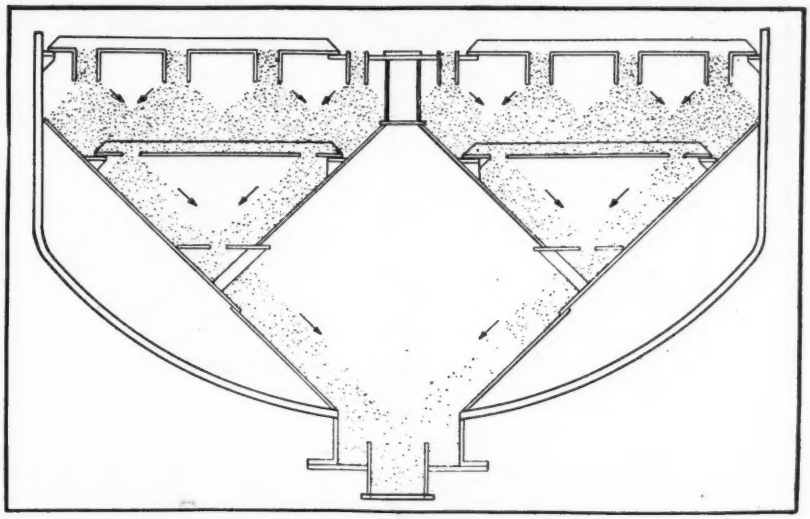

Fig. 4—Typical reactor drawoff baffles.

Elevators used to transfer the catalyst between the two vessels are of a slow speed continuous chain type having buckets attached to the chain links. The extensive use of mild alloys permits continuous operation at the elevated temperatures encountered without the failure of the chain or driving sprockets.

Circulation of the catalyst results in a small amount of attrition; based on the weight of catalyst being circulated the fines and dust amount to approximately 0.03 per cent. Since periodic catalyst replacement is required to maintain catalyst activity at a high level, a portion of the catalyst stream is passed continuously through an elutriator, thus removing the fines which have been formed and maintaining the proper catalyst particle size. A cyclone separator on the oil vapor outlet prevented carryover of catalyst into the fractionation system and another cyclone on the flue gas vent line eliminated discharge of catalyst fines to the atmosphere.

After approximately two years of intensive development work on this semi-plant unit, design of commercial units was undertaken on the basis of the data obtained. The first commercial TCC unit to go on stream was at the Beaumont, Texas refinery of the Magnolia Petroleum Company on October 7, 1943. This unit had essentially the same mechanical construction and operating features as the 500 BPD unit, as did the other units then under construction.

While the present TCC design is substantially the same as that of the 500 BPD unit and early commercial units, continued equipment and process development work in the past few years has resulted in several modifications of the original design. These are listed and discussed in the following paragraphs.

REACTOR The first commercial reactors had been designed on the basis of a granular clay (30-60 mesh)catalyst charge but improved catalyst manufacturing methods made possible the production of clay pellets (4-10 mesh) with good physical characteristics. It was found with the larger size catalyst that the stacked angles could be removed without impairing contact efficiency. This increased the effective volume of the bed and also made possible the introduction of adjustable clay feed pipes which permit a change in bed depth. Thus, the cracking severity can be varied without

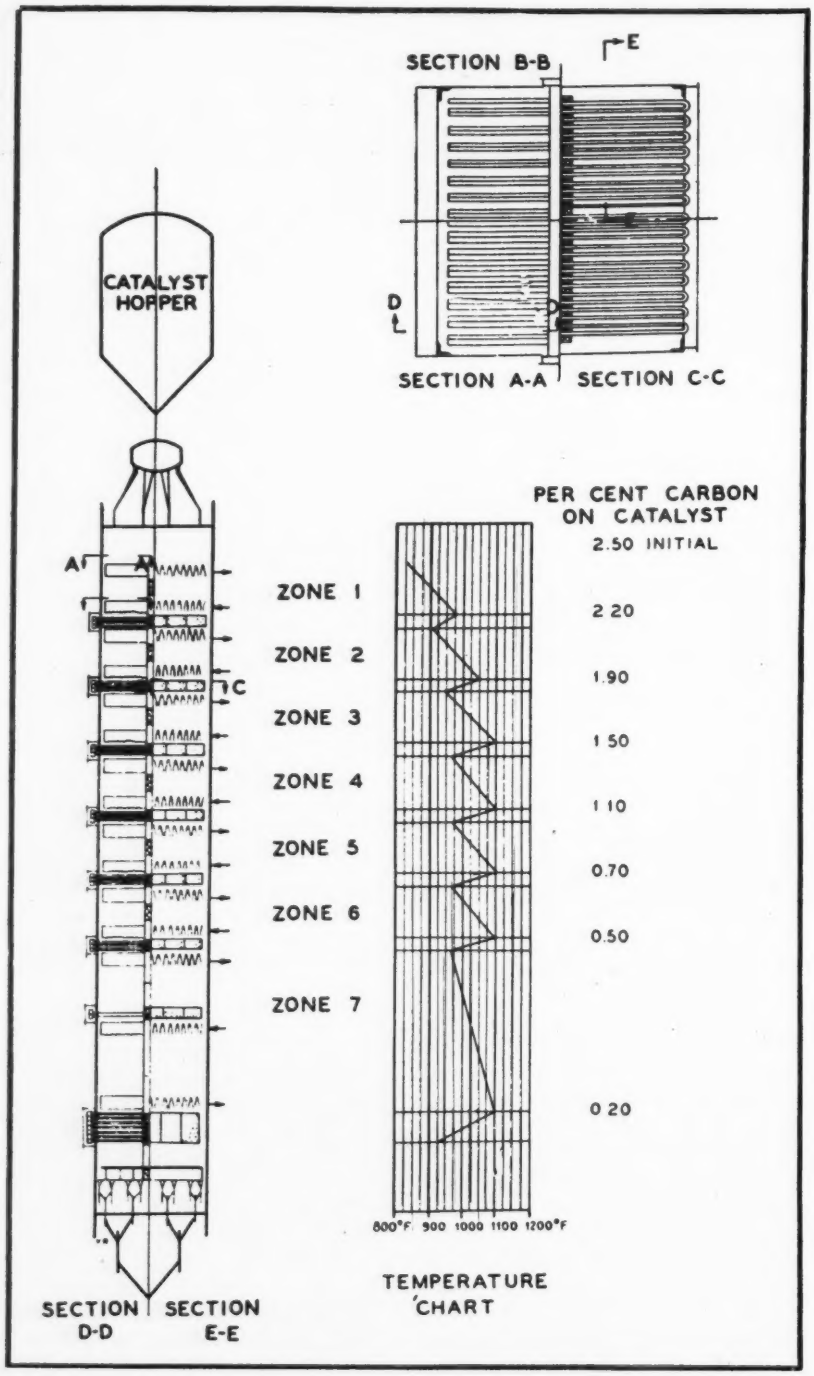

Fig. 5—Arrangement and operating conditions, T.C.C. kiln

changing the charge rate or going to excessive temperatures.

In addition, the utilization of purge steam has been improved by introducing the steam in the free space left by the catalyst as it cones below the top flow control plate (see Figure IV). This equalizes the steam pressure and insures even distribution of steam over the entire reactor cross-section.

KILN The air distribution and flue gas collection systems as installed on the first commercial units were similar to those used on the semi-plant unit. It was found that with the improved catalyst the collector and distributor vertical louvered pipes could be removed without lowering the contact efficiency. The design of the grids now in use is not unlike that of the oil inlet grid (see Figure III). Each burning zone has an air inlet grid in the center of the zone and two flue gas collection grids, one just below and the other just above the cooling zones. In addition, the spiral-finned cooling coils have been replaced by plain horizontal tubes, which are easier to install and eliminate the tendency of the catalyst to bridge between adjacent fins. The net effect of these changes is to increase the utilization of air by permitting longer contact with the catalyst, and to increase the effective volume of the kiln and so increase the carbon burning capacity and lower the residual carbon content of the catalyst.

In the commercial units, the cooling water is pumped through the coils under pressure in such quantities that ordinarily about five parts of water are circulated for every part of steam generated. Steam production actually takes place in a separate steam drum, so that salt deposition in the tubes is not a problem. In effect, the temperature control of the system is simply a forced-circulation water tube boiler. Changes in heat load can be taken care of by cutting cooling coils in or out of service while the unit is operating.

ELEVATORS The catalyst transfer system has proved to be exceptionally trouble-free and rugged, the point of greatest wear occurring at the top chain-sprocket teeth. However, the existing elevator installations are being equipped with a traction drive between the chain and head shaft and all new units will have this feature. In this manner wear is distributed around the periphery of the traction rim instead of being concentrated at the sprocket teeth, and the estimated life of the drive mechanism increased to five-ten years.

The conclusion of this article will appear in the next issue.

Expanding Physics Research Division Broadens Its Activities

By DR. G. M. WEBB,
DR. W. S. GALLAWAY,
DR. M. J. MURRAY,
and DR. C. H. EHRHARDT,
Physics Div., Universal Oil Products Co.

The Physics Division of Universal Oil Products Company has just moved into a new home. It is a functional building, designed in large part by the men who are to work in it. The new structure was built adjoining the outgrown previous quarters of the division on the 27-acre tract occupied by the company's research and development laboratories at Riverside, Illinois.

The move was made necessary by the widening scope and the increasing volume of the work of the division. The new building affords the needed space, equipment and conditions favorable for the varied research programs being carried on by the group.

The physics division had its beginning in 1939. Up to that time relatively little attention had been given to the possibilities of applying physical methods to the solution of chemical problems in the refining industry.

Catalysis at that time was of constantly growing importance, but knowledge of the properties of solid catalysts was limited; consequently, the first task the division set for itself was a thorough study of the catalysts then in use, to determine the controlling factors with respect to catalyst life, activity, mechanical strength and utilization.

As the work progressed, the knowledge of existing catalysts has been increased and their efficiency has been improved. This is notably true for the nickel hydrogenation catalyst, the phosphoric acid polymerization catalyst, the chromia-alumina dehyrogenation catalyst, the silica-alumina and silica-magnesia cracking catalysts, and the molybdena-alumina hydroforming catalyst.

In addition, some new catalysts have been developed, perfected and commercialized, such as the metallic aluminum dehydrofluorination catalyst.

The work on catalysts was only the beginning. For several years the science of physics has been playing a role of increasing importance in hydrocarbon research. Various physical procedures have been developed and new apparatus has been brought out. Keeping pace with advances in physical research methods, this company has adopted such of the new techniques as could be profitably applied in the oil industry. The field of activities has been extended to cover physical investigation of petroleum, gases and other materials as well as catalysts.

The physics division today has three primary functions:

1. Improvement of known catalysts and a study of their fundamental properties.
2. The identification and quantitative analysis of gaseous and liquid hydrocarbons and the products made from them.
3. General physico-chemical studies of interest to the petroleum industry.

Description of Building

The new home of the physics division was designed in line with modern ideas for such buildings. It is a gable-roofed structure, 105 feet long by 32 feet wide, and is 13 feet to the eaves. Water, steam, air and vacuum lines, and 110 and 220 volt electric power are brought into the building in a trench, led through a wall to the attic and from thence distributed to the various rooms by carrying the lines down through the partition walls between the studs. These service lines are easily accessible for maintenance and repairs by removing steel plates which are fastened to light angles attached to the studs. The service lines in each room are supported on racks fastened to the wall and are concealed by the benches and tables, all of which can be moved when necessary to permit work on the service lines.

Individual power panels are provided for each room where necessary. The panels are installed in hall partition walls and are of the flush type with the doors opening into the hall. The main power panel

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is located in the large room used as a general laboratory. With this arrangement, if the power should fail in one room the others are unaffected.

The air in the physics building is filtered, warmed (or cooled) and humidified by heating and air conditioning equipment installed in the attic. In order to avoid vibration in the building, the equipment is supported on pipe columns which are located in the dead space in the partition walls, free from contact with the walls. These columns are set on concrete spread footings and are insulated from the floor by cork expansion joints. Air conditioning and the anti-vibration measures are necessary to assure accuracy in the operation of the extremely sensitive apparatus.

The accompanying floor plan shows how the interior is divided. Space has been reserved for enlargement of the building when increasing scope and volume of work make it necessary.

Special Equipment

The equipment housed in the new building includes ultraviolet, visible, infrared and Raman spectroscopic apparatuses, a mass spectrometer, X-ray and electron diffraction units, an electron microscope, microphotometers, surface area measuring equipment and a wide variety of physical and electrical apparatuses for determining various properties of oils and catalysts, such as dielectric constants, porosities, freezing points and others.

In the following sections, some of these instruments are described, and the kind of information that can be obtained with them is pointed out.

Ultraviolet Spectrophotometry

When ultraviolet light is passed through a sample of a chemical compound, certain wave lengths of light are absorbed more than others. This absorption spectrum, which may be obtained with an ultraviolet spectrophotometer, is different for each compound. This fact is made wide use of in the petroleum industry, and application of ultraviolet spectrophotometric methods has resulted in improved methods for making many types of analyses. For example, these methods are used in controlling the operation of hydro-

Recording Microphotometer

forming units for the maximum production of toluene and in the control of plants, making raw materials for synthetic rubber manufacture, such as butadiene and styrene.

Infrared Spectroscopy

The applications of infrared spectroscopy are based on the important facts that no two hydrocarbons exhibit the same absorption pattern and that the pattern obtained for a mixture is simply the sum of those of the components. Thus, it has been possible with the infrared spectrometer to obtain reliable quantitative and qualitative analyses that were extremely difficult or time consuming by other methods. Among these, to mention only two, are the studies of the products of alkylation and isomerization plants which led to increased production of better aviation gasoline.

Raman Spectroscopy

The Raman effect, though obtained in an entirely different manner than the infrared absorption spectrum, is considered to be a complement to infrared absorption work. As in infrared absorption, each compound exhibits its spectrum, which is different from that of every other compound. The Raman effect is mainly useful in qualitative identification and semi-quantitative analyses of organic compounds in unknown mixtures. It can be employed with aqueous solutions as well as with anhydrous mixtures.

Mass Spectrometry

When a molecular compound is bombarded with electrons, the molecules are "cracked," and a large number of positively charged fragments is produced. The relative abundancies of the various fragments are, for a given set of operating conditions, unique for each compound. It is this property which is utilized in mass spectrometric work. The mass spectrometer provides a new tool for the quantitative analysis of complex mixtures of light hydrocarbon gases encountered in many petroleum refining operations. It is indispensable in determining the presence and identity of trace impurities in gases, such as butadiene, helium and oxygen, to mention a few. It can also be used in identifying the isotopes of various elements, such as those of carbon having masses of 12 and 13. This makes it possible to study mechanism of reactions by incorporating a small amount of a tracer isotope in the reaction mixture, and following the entire reaction by analyzing the reaction products for the tracer isotope by means of the mass spectrometer.

Emission Spectroscopy

The large Bausch and Lomb Littrow spectrograph rounds out the spectrographic facilities at U.O.P.

This unit is primarily designed for the study of emission spectra in the ultraviolet, visible, and photographic infrared regions. Complete description of this type of instrument and its uses have been published in several books, notable among them is Brode's "Chemical Spectroscopy."

X-Ray Diffraction

X-ray diffraction offers a method of studying the arrangement of the atoms in all kinds of matter. By this method it is possible to distinguish between various crystalline forms of the same material, and between different states of hydration. X-ray diffraction also presents a method of measuring the average crystal size of powdered materials. A wide range of catalytic materials have been studied by this means. For example, studies by these methods on the transformations of Al_2O_3 under various conditions of heat treatment, aided greatly in the development of a superior hydroforming catalyst for the production of toluene for the war and for the improvement of post-war motor gasoline.

Electron Microscopy

The electron microscope has made visible an entirely new realm of previously invisible objects. Magnetic coils acting on a beam of high speed electrons permit objects which are only one one-hundredth of the minimum size visible in the best optical microscopes to be photographed. The construction of the electronmicroscope is entirely analogous to the ordinary optical microscope. There is a source of "light," a condensing lens to focus the light on the specimen, an objective lens, a projector lens and finally a camera to record the magnified image.

The light source is an electron gun. This consists of an incandescent tungsten filament, which supplies the electrons, and an anode which is a perforated disc. A high potential of around 50,000 volts is applied between the filament and the anode to impart a high velocity to the electrons which pass through the hole in the anode into the condensing lens.

The condensing lens is a cylindrical magnetic coil completely encased in iron except for a small gap in the tubular iron core along the inside of the coil. The magnetic field across this gap constitutes the magnetic lens. This magnetic lens acts on the electron beam in an exactly analogous manner to the action of a glass lens on a beam of light. This condensing lens concentrates the electron beam onto the specimen to be examined.

The objective and projector lenses are constructed similarly to the condensing lens and perform the same function as the analogous lenses in the optical microscope. The final image may be viewed on a fluorescent screen or may be recorded on a photographic plate.

Since the process of image formation is by means of transmitted electrons, the entire apparatus must be evacuated to a very low pressure to avoid collisions of the electrons with gas molecules. The speciment support must also be transparent to the electron beam. This means that it must be very thin, of the order of one-millionth of an inch thick.

The usual support is a film of collodion made by placing one drop of a solution of the material in a suitable solvent onto a water surface. The solution spreads out under the action of the forces of surface tension, and evaporation of the solvent leaves an invisible film of the plastic floating on the water surface. Small sections of this film are then picked up on ⅛" discs of 200 mesh screens. These are the mounts on which the speciments are placed for examination in the microscope.

General Physico-Chemical Work

In addition to the above, the building includes a general laboratory in which physico-chemical studies on catalysts, oils, etc., are carried out. The equipment installed in this laboratory includes an Andrews' apparatus for studying the P-V-T relations of hydrocarbons and their critical properties, a surface area unit which is used for determining the surface properties and pore size distributions of catalysts, several optical microscopes, a fairly extensive supply of the chemical glassware, etc., used in preparing catalysts on a small scale, and a group of muffle furnaces for calcining catalysts at temperatures up to 2500°F. in various atmospheres.

Transamerica Subsidiary to Aid in Search for Philippine Oil

Search for petroleum deposits in the Philippine Islands, interrupted by war in the Pacific, will continue with the aid of Western capital and enterprise, it was revealed in an announcement made by E. D. Woodruff, President of Occidental Corporation, a wholly-owned subsidiary of Transamerica Corporation. Occidental Corporation has acquired a substantial interest in the Far East Oil Development Co., Inc., a Philippine organization holding the only two privately-owned oil and gas leases not cancelled by the Philippine Petroleum Act of 1937.

According to Colonel Andres Soriano, President of the Far East Oil Development Company an international industrial leader, a well was being drilled on the Company's lease which, on November 30, 1941, was coring saturated oil sands. After Pearl Harbor, December 7th, operations were ordered suspended by General Douglas MacArthur and all physical evidence destroyed.

The leases, comprising a total of approximately 70,000 acres and located in the northern part of the Island of Cebu and on Bondoc Peninsula on the southwestern tip of the Island of Luzon, embrace well-defined geological structures outlined after years of careful research, directed by the well-known American geologist, Grant W. Corby.

"It is planned to fully develop the leases, should commercial production result from the present exploratory program," Mr. Woodruff stated.

The Capital Company, also a wholly-owned Transamerica subsidiary headed by Mr. Woodruff, will participate in the program by assigning personnel, equipment and the benefit of its own successful experience in the oil industry.

Among the other substantial stockholders in the Far East Oil Development Company, Inc., is the Caltex Corporation, jointly owned by the Standard Oil Company of California and the Texas Corporation.

Almost three out of every four producing oil wells in the United States are "strippers."

Field Development

PREPARED FROM CALIFORNIA OIL WORLD NEWS SERVICE

Los Angeles Basin

Gardena Discovery Flows Quantity Oil

British-American Oil Prod. Co. has provided the chief interest in the Basin by chalking up a new discovery of considerable importance in the Gardena area, through the medium of its British-American-Texas-Bodger No. 1 in Sec. 22-3s-14w.

The well was completed for an estimated 1200 barrels of 26 gravity crude oil daily, along with 400,000 cubic feet of gas through a 20/64-inch bean.

Total depth is 9154, with 8⅝-inch casing cemented at 9087 ft. Some 88 ft. of 5½-inch, including 70 ft. of perforated, is set at 9153 ft. Yield at last reports was 1040 barrels of 26 gravity crude, cutting 2 per cent through a choke varying between 18-22/64-inch. Tubing pressure was reported as 1120 pounds with zero on the casing.

Absence of pressure on the casing is attributed to mud in the annular space between tubing and casing, which needed more time to settle out. The tubing was washed, but not the casing.

Some days must necessarily elapse before the mud is entirely cleaned up and the well tested potentially.

Severns Drilling Co., who drilled the discovery well under contract, is given much credit for accomplishing what others tried in the area without commercial success. The well was the first contract job in the area.

Lancaster Try About To Spud

Near Lancaster in Antelope Valley, Amapola Oil Corp., is about to start the drill in its Amapola No. 1 in Sec. 6-6n-12w, Los Angeles County.

West Newport Yet Developing

Warren L. Meeker and Russell D. Garner have completed Deeble No. 1 in Sec. 13-6s-11w in the widening Newport Beach area of Orange County, flowing an estimated 400 barrels of 26 gravity oil a day from perforated intervals at 3647-3680 and 3714-3719 ft.

Signal Petroleum Co. of Calif. has mapped out a drilling program of four drilling jobs, three of which will offset the new Deeble producer. Callens No. 2 in Sec. 18-6s-10w is nearing the spudding-in stage. Standard Oil Co., meantime, is drilling ahead with McLeod No. 1 in the section at 2550 ft., after running electric log to 2525 ft. On formation test of the interval of 2335-2420 ft., recovery was mud and gassy water. Recovery on formation trial of the interval 2472-2525 ft. was gas and mud. Sunset Oil Co. has reached a depth of 6025 ft. with Meyers No. 1 in Sec. 17. Tide Water Associated Oil Co.'s Aldrich Fee No. 1 in Sec. 13 is drilling at 600 ft.

Camay Drilling Company crew on Long Beach Oil Development Company's well X-29, drilling alongside Cerritos Channel in Zone 237. The well was down about 6200 feet when picture was taken. Left to Right: A. C. Conway, C. C. Joiner, B. D. Willhite, J. C. Malloy and D. F. Nicholson, of Camay, and J. J. Rogers, foreman for Long Beach Oil Oil Development Company.

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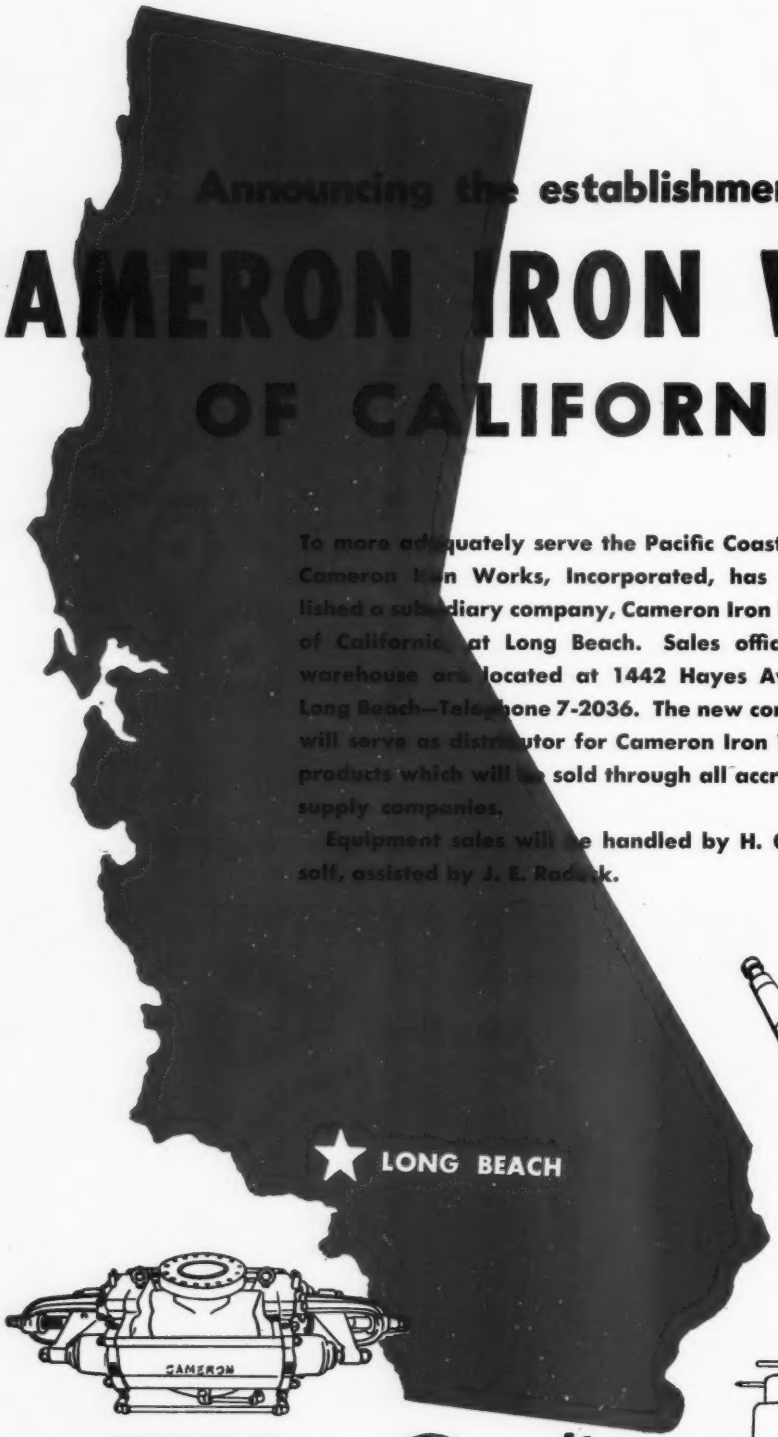
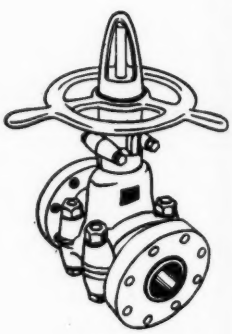
To more adequately serve the Pacific Coast area, Cameron Iron Works, Incorporated, has established a subsidiary company, Cameron Iron Works of California, at Long Beach. Sales office and warehouse are located at 1442 Hayes Avenue, Long Beach—Telephone 7-2036. The new company will serve as distributor for Cameron Iron Works products which will be sold through all accredited supply companies.

Equipment sales will be handled by H. G. Musolf, assisted by J. E. Radcliffe.





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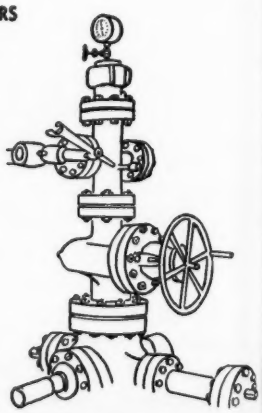
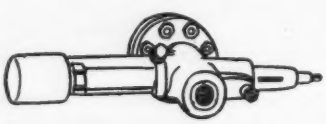


SAFETY XMAS TREES



XMAS TREE FLOW WINGS

MUD LINE PRESSURE GAUGES

WEIGHT INDICATORS

SHEAR-RELIEF VALVES

Bankline Finishes Del Valle Producer

Bankline Oil Co. has added Black No. 101 in Sec. 13-4n-18w in the Del Valle field, pumping 105 barrels of 26.1 gravity oil a day from 2427 ft. Casing is cemented at 2249 ft. No. 103 has been spudded. Superior Oil Co. and British-American Oil Prod. Co. are coring Black No. 5 below 3800 ft. Water shut off on the 7-inch set at 3330 ft. was approved on trial.

Brea Test Rigs Pump

Having plugged back from 2336 to 1680 ft., El Rancho Exploration Co. is rigging pump to Rancho No. 1 wildcat in Sec. 30-2s-9w in the Brea area, Los Angeles County.

New Wildcat Try For Yorba Linda

Southeast of the Yorba Linda field, General Exploration is rigging derrick for its Marshburn No. 1 exploratory venture in Sec. 23-3s-9w, Orange County. The play, involving 500 acres, shares interest with several other companies, including Basin Oil Co., C. G. Willis and Aero Electric Corp.

Chino Hills Project Drills

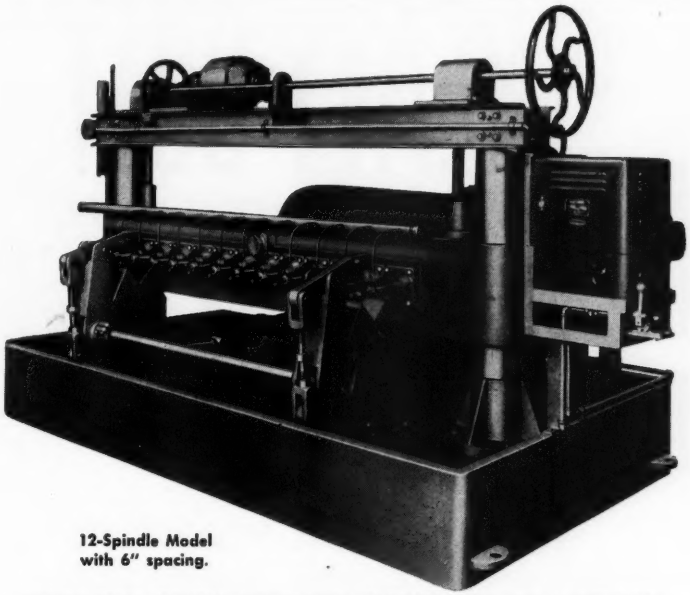
Grayco Oil Co. is drilling steadily ahead at a depth of 2170 ft. with Mahla No. 1 test in Sec. 13-3s-8w in the Chino Hills, San Bernardino County. In Sec. 33-2s-8w, C. W. Ginter and Assoc., Kraemer-Backs No. 3 is making hole ahead in shale at 3268 ft.

Basin Drills Inglewood Try

Basin Oil Co., Standard Brick No. 1 in Sec. 28-2s-14w in the Inglewood area is drilling on down below 8850 ft. T. P. Pike Drilling Co. is in charge of drilling.

Mission Land Test Progresses

Near old San Fernando Mission, Seaboard Oil Co. is drilling hard shale at 7550 ft. with Mission Land No. 8-1 in Sec. 25-3n-16w in the Newhall area. Contractor is the newly organized firm of Hayes & Sprague, Inc.



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Beach Project Ready For Test

After redrilling to 7895 ft., Southern Belle Oil Co. is ready to test water shut off at 6340 ft. in Rex No. 12 in the Huntington Beach area. Original depth is 8386 ft., with 6⅝-inch casing cemented at 7893 ft. Operator plans to gun perforate and question sands at 6735-6770 ft.

Cellar In For Fairview Test

Tide Water Associated Oil Co. has cellar excavated for its Norris No. 2 prospect in Sec. 8-6s-10w in the Fairview area of Orange County. Fowler Drilling Co. is contractor.

Dominguez Test Drilling Ahead

Union Oil Co. is making hole at a depth of 7959 ft. with Hellman No. 58 in the Dominguez area. In the Simi area, Los Angeles County, Simi No. 7 in Sec. 22-3n-17w has cemented 6⅝-inch at 609 ft. with rotary. Drilled ahead to 647 ft. with cable tools, line was cut at 614 ft. when tools stuck on bottom and the project is standing idle.

Mirada Explorer Reaches Depth

General Petroleum Corp., La Mirada Comm. No. 46-1 near La Mirada station of the Santa Fe Railway is drilling ahead beyond the 9100-ft. mark. Location is in Sec. 16-3s-11w.

Beach Interest Still Expanding

A. W. Lyddon, Operator, Crew Comm. No. 1 wildcat test in Sec. 32-5s-10w in the Huntington Beach area is drilling below 7300 ft. Lamb Comm. No. 2 in Sec. 6-6s-10w is yet only a location.

L. & W. Oil Co., Surf No. 1 in Sec. 13-6s-11w is coring at 2500 ft. Barnhart-Morrow Cons., Alford No. 1 in Sec. 18-6s-10w swabbed and flowed by heads muddy water with a little oil. Total depth is 3887 with plug at 2447 ft. Pump is being rigged in an effort to exhaust water, which is believed drilling water.

Coastal and Northern District

Butte County Gas Try Listed

General Petroleum Corp. is rigging derrick for a gas test in the Chico area of Butte County in Sec. 33-20n-1w. The well is known as Llano Seco No. 1 and is located about six miles southwest of Standard Oil Co.'s Donohoe Fee No. 1 in Sec. 6, a discoverer of substantial gas production between 2140 and 2200 ft. This well went to a bottom of 6000 ft., with the lower portion of the hole plugged off, when it reacted wet on tests. Buttes Oilfields, Inc., Buttes-Ward No. 2 in Sec. 5-15n-1e in the Marysville Buttes area of Sutter County is drilling at 4950 ft.

Gaviota Wildcat Gives Up Search

Following a confirming check with electric log, the Barnsdall-Honolulu Oil Co. combination was convinced further prospecting at that location was hopeless and Petan No. 1 in Sec. 5-5n-32w in the Gaviota area of Santa Barbara County has been abandoned. Total depth is 4986 ft.

Thornton Gas Well Comes In

Amerada Petroleum Corp.'s Thornton Unit No. 2 test in Sec. 28-5n-5e in the Thornton area, San Joaquin County, has been completed at 3400 ft. for 9,664,000 cubic feet of gas and shut in. Nicolaus No. 1 in Sec. 26 is drilling in surface formations. At Cache Slough in Solano County, Church No. 2 has been abandoned at 6200 ft. as a gas failure.

Half Moon Bay Test Yet Site

E. T. Willard's No. 2 well in Sec. 15-6s-5w in the Half Moon Bay area of San Mateo County is yet only a location. The drill site is in the northeast corner of that portion of the Sarah Wilson lease in the section.

Eureka Test Running Log

With hole bottomed at 7594 ft., Texas Co. is running electric log in its Holmes-Eureka No. 3 in Sec. 22-3n-1w in the Eureka area of Humboldt County. This test was originally designed to look for oil. If the prime objective failed to make its appearance, gas would be sought, according to plans.

Los Alamos Job Going On Down

In the Los Alamos area, Whittier Associates is drilling in hard shale at 6550 ft. with Barham No. 3 in Sec. 11-7n-32w, Santa Barbara County. The try found a number of interesting showings at shallower levels, but it was decided to dig on down for a look at lower formations.

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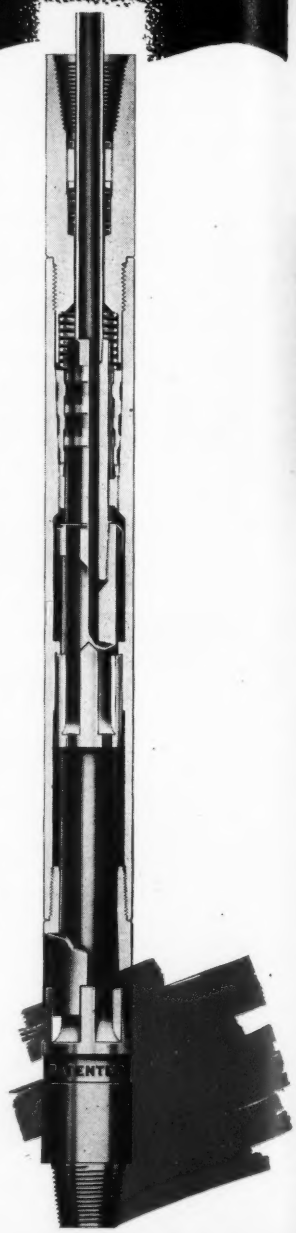

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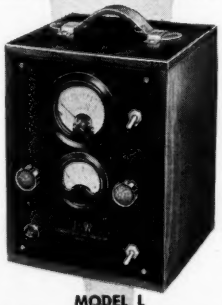

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Union Drills Sisquoc Test

Sisquoc No. 6 test in Sec. 2-8n-31w in the Sisquoc area is being drilled by Union Oil Co. at a depth of 5208 ft., without intimation of what has been turned up in the well to date.

Yolo County Prospect Rigs

Shell Oil Co. is rigging derrick for its Winters Unit No. 1 gas test in Sec. 19-8n-1e in the Winters area, Yolo County. Locations for Wagenet No. 1 and No. 2 have been staked at Kirby Hills in Sections 24 and 19-4n-1e, respectively.

Paso Robles Test Drills

Under the banner of the Paso Robles Mutual Oil Dev. Assn. a wildcat venture in Sec. 3-26s-12e in the Paso Robles area of San Luis Obispo County is making hole steadily ahead below 1100 ft. This project has the backing of a number of Paso Robles business leaders.

Goleta Area Fails Ohio Oil

Efforts of Ohio Oil Co. to uncover oil in the Goleta area by drilling Prevedello No. 1 in Sec. 1-4n-28w to 3266 ft. failed of their purpose and the well has been given up.

Monterey County Tests Yet Work

Near San Ardo in Monterey County, Texas Co. is ready to perforate higher its Aurignac No. 1 in Sec. 4-23s-10e, after intervals between 3120 and 3170 ft. tested wet. Total depth is 4201, with plug at 3210 ft. C.C.M.O. Co., San Ardo No. 6-G-1 in Sec. 6 is drilling at 5748 ft.

Gato Ridge Adds Pumper

Barnsdall Oil Co.'s Tognazzini No. 17 in Sec. 9-8n-32w at Gato Ridge is a completion at 3501 ft. Estimated yield on the pump is 450 barrels daily.

Conejo Well Redrilling

Sandberg Petroleum Co.'s Janss No. 1 in Sec. 33-2n-19w in the Conejo area, which went originally to 5620 ft., is redrilling at 5583 ft.

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San Joaquin Valley

Kettleman Hills Well Cleaned Up

Standard Oil Co. has successfully recovered remaining fish in its No. 73-30V deep test in Sec. 30-23s-19e in the Middle Dome area of Kettleman Hills, Kings County. Casing has been run and cemented on bottom at 10,921 either as a protective measure or as a prelude to trials of showings already found.

Mechanical difficulties interposed early in June. Bolsa Chica Oil Corp. has a 25 per cent interest in the project.

Cantua Creek Try Abandoned

Having found the Vaqueros zone wet, Bankline Oil Co. has abandoned its Kenyon No. 1 wildcat in Sec. 4-17s-15e in the Cantua Creek area, Fresno County. Total depth is 6675 ft.

Race Track Hill Test Drills Down

On the northwest fringe of the Race Track Hill area, J. Paul Getty is making hole ahead at 3550 ft. with Gundry No. 68-X in Sec. 33-29s-29e in the Race Track Hill area. The lease was obtained from Independent Exploration Co., who secured it on a farm-out from British-American Oil Prod. Co.

Belridge Depth Try Spot Cores

San Joaquin Valley oil interest centers on Belridge Oil Co.'s No. 62-W-33 deep test in Sec. 33-28s-21e in the South Belridge area, which is drilling ahead and spot coring at a depth of 13,465 ft. Information as the well gets deeper is withheld by the company. Consensus, nevertheless, credits the test with uncovering something of worth at a number of levels.

Richfield Oil Corp.'s scheduled deep try on the Berry property, Berry No. 1 in Sec. 30-28s-21e is standing with surface pipe set on bottom at 1008 ft.

Buena Vista Try In Shale

Near Buena Vista Lake, Seaboard Oil Co. is drilling in hard cherty shale at 11,750 ft. with SWUM-BVA No. 73-14, a wildcat test in Sec. 14-32s-25e. Continental Oil Co. has reached 8800 ft. with BVA No. 1 in Sec. 8 and is continuing to prospect on down.

Kern Front Test Grades

On the northwest quarter of Sec. 22-28s-28e in the Kern Front area, Bender Oil Operations is grading ground for Claire No. 3. Claire No. 2 was recently suspended after being finished at a plugged depth of 2747 ft. for a few barrels of oil.

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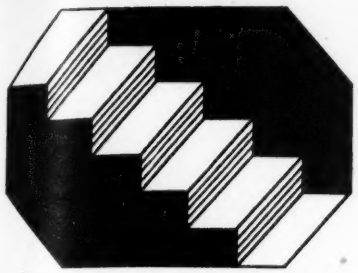

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Devils Den Digs Ahead

In the Devils Den area, S. R. DeKalb is redrilling ahead below 700 ft., with Blake No. 1, a test well located in Sec. 25-25s-18e.

Temblor Ranch Try Rigs Pump

With bottom at 573 and the top of the Phacoides zone placed at 465 ft., Gannon, Gannon & Aslin is ready to pump No. 69-J-1 in Sec. 36-29s-20e in the Temblor Ranch area of Kings County.

Pyramid Hills Lists New Test

Genn Dial has made location for Kings No. 1 in Sec. 13-24s-17e in the Pyramid Hills of Kings County. In Sec. 8-24s-18e, Guy Richardson has carried Holtz and Zanetti No. 1 to a depth of 1650 ft. in brown shale and suspended operations. Ridge Petroleum Corp.'s No. 13 in Sec. 17 is drilling at 845 ft. in shale.

Elsewhere in Kings County, Kings County Oil Co. is ready to run casing in its von Glahn No. 1 in Sec. 4-23s-22e in the Tulare Lake area. Kings Exploration Co.'s Avenal No. 1 in Sec. 18-23s-17e in the Reef Ridge district is standing inactive at 2862 ft.

Grapevine Job Derrick Rigged

Oceanic Oil Co.'s K.C.L. No. 1 in Sec. 22-10n-20w in the Grapevine area is rigged up, but idle. Gene Reid Drilling Co. will be in charge of drilling.

Terra Bella Try Reaches Granite

On a 650-acre lease in the Terra Bella area, Murray No. 1, sponsored by Gene Reid Exploration Co. in Sec. 21-22s-27e, is bottomed at 1433 ft. in granite. Originally designed as a try for schist oil, the well may test uphole for production similar to that developed in the area by Holly Oil Co. wells.

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Miramonte Try Valley Depth Job

Pacific Western Oil Co.'s National Royalties No. 1 in Sec. 5-26s-22e in the Miramonte area of Kern County is now the deepest drilling job in the valley, having gone beyond the 13,800-ft. mark. Drilling is being continued ahead.

Cymric Test Pumps Water

Argentia Cons. Mining Co., Olympic No. 17 in Sec. 22-29s-21e in the Cymric field, pumped water with a scum of oil on test from plugged depth of 1515 ft. Old bottom is 6527 ft.

Another Oceanic zone producer has been finished by Standard Oil Co. It is Weston No. 203-26W in Sec. 26-29s-21e, which came in from 4960 ft. for an initial yield of 372 barrels of 38 gravity oil and 345,000 cubic feet of gas through a 12/64-inch bean. The Oceanic oil sand was topped at 4845 ft.

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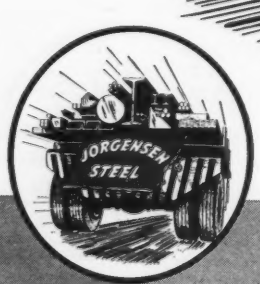

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Personalities IN THE NEWS

Wallace Curtis Appointed Public Relations Director of G. P.

President S. J. Dickey of General Petroleum Corporation, the Pacific Coast affiliate of Socony Vacuum Oil Company, today announced the appointment of Wallace B. Curtis to the newly created position of Public Relations Director. Pro-

Wallace Curtis

moted from the post of Advertising Manager which he has held for the past fourteen years, Curtis has a previous background of eight years in other marketing activities for the same company, preceded by several years of promotion, advertising and public relations work in the commercial aviation and resort fields. He was for some time associated with the Curry interests in Yosemite National Park and pioneered in the flying service between Los Angeles and Catalina Island. He is an engineering graduate of Stanford University and served as an engineering officer in the United States Navy during the first world war.

Curtis will make his headquarters in the General Petroleum executive offices at Los Angeles.

When E. C. Brown and his Long Beach drilling organization finished Ten Eyck No. 1 for Cleveland Oil Co. in the Mountain View area, an excellent producer was chalked up. Initial was around 2000 barrels daily. Brown has drilling crews as far away as Saudi Arabia digging wells for the Arabian American Oil Co., a Standard of California subsidiary.

Larry Campbell, chairman; Harold Lemaire, Marjorie Mullick and Barbara Holmstead were responsible for the splendid program arranged for the picnic and outing of the survey and drafting staff of Shell Oil Co. in the Los Angeles office, held at Indian Springs near Montrose. The program included swimming, dancing, baseball, deck tennis and volleyball. All members of families of Shell employees participated in the affair.

Jere Bayard & Associates, advertising agency, are now occupying their new home at 2504 W. 7th St., Los Angeles, 5, and are answering to all calls on FAirfax 1278. The new quarters are light and spacious with high, wide windows and a second-story scenic view across Westlake Park.

S. S. Barnes of Harman Pump Co. recently completed a business and pleasure trip through Arizona, Oklahoma, Texas and Alabama where he spread the gospel about the Torrance Oilfield Heater that the company builds at 1575 Compton Avenue, Los Angeles, 21.

Wedding bells will ring in October for Elaine Janice Dechter, daughter of the late Raphael Dechter, oil attorney, and Marvin S. Friedman.

Severance Named Asst. Secretary Standard

Election of Harold L. Severance as an assistant secretary of the Standard Oil Company of California was announced Aug. 26th.

Severance was graduated from Stanford University in 1932 and went to work for Standard the following year in the Richmond refin-

Harold L. Severance

ery. Subsequently he served on the accounting staff of the Manufacturing Department. He was attached to the secretary's office in 1940.

He lives in Palo Alto (820 Hamilton Street) with his wife and two children.

Michael Hall, cast as the son of Myrna Loy and Fredric March in "The Best Years of Our Lives," a Samuel Goldwyn picture directed by William Wyler, is the grandson of the late Fred E. Hall, Kern County oil producer, banker and capitalist, who was a candidate for governor of California in 1912. Michael, just 19, was discovered by a scout at University of California at Los Angeles Little Theater.

Meunier Now Adv. Mgr. General Petroleum

Appointment of Frank C. Meunier as manager of advertising and sales promotion of the General Petroleum Corporation was announced by C. S. Beesemyer, vice-president.

Frank C. Meunier

Meunier joined General Petroleum in 1932, four years following his graduation from the University of Southern California, during which period he operated his own service stations. Successively, he served as automotive engineer, manager of lubrication sales in the Washington division, sales manager in the Oregon division and district manager of the Northern California division. A year ago he was appointed General Petroleum's sales promotion manager. His headquarters will be in the corporation's executive offices at Los Angeles.

Rocky Mountain Drilling Co., headed by ingenious Dorsey and Harry Straitiff and L. A. Whipple, is being given much credit by the industry generally for the successful completion of the fishing job in Standard's deep test in the Middle Dome wildcat area of Kettleman Hills. About 9200 ft. of drill pipe stuck in the hole, but Rocky Mountain made a 100 per cent recovery, an enviable and inspiring performance. Congratulations.

L. M. Lockhart, sponsor of the Macrate No. 1 drilling in the Tip Top area of Ventura County, is one of the Lockhart brothers who organized the Rio Grande Oil Co. Tom Pike is contract driller on the Tip Top project.

The Investor's Reader, published by Merrill, Lynch, Pierce, Fenner & Beane, prominently features in a recent issue an interesting article on Union Oil's Reese Taylor. Of particular significance, the article stated, are the oil executive's thoughtful observations on national problems. "As a nation," Taylor is quoted as saying, "it is for us to determine whether we shall return to a proved system of free economy, or surrender our inherent rights and privileges to Government bureaucracy. Upon the decision rests the future of Union Oil Co. and all American industry."

Jack Nofziger of Drayer-Hanson Co., who has carved out a notable career in the public relations field, previously was a widely known newspaperman. In his early days he was a star baseball player. While a member of the Fourth Estate, Jack won acclaim in both the editorial and art departments. His cartoons were a daily feature for years on the sports pages of the Los Angeles Herald-Express.

During the summer months, Santa Catalina Island and the cooling breezes of the blue Pacific have been the week-end attraction for Edith McKain, secretary of the P. H. O'Neill interests. While visiting the island, Miss McKain stops with her sister, an Avalon resident.

Lieutenant General James H. Doolittle, former commander of the U. S. Eighth Air Force and now a Shell Oil Co. executive, who was the guest of honor recently at a party in the California Club of Los Angeles, has arrived in Cairo by plane on a routine business trip. From Cairo he expects to go to Casablanca, Gibraltar and Portugal, before returning home.

Up and around after major surgery at a Santa Monica hospital is George Marcell of Hillview Oil Co. George is continuing his oil development program and says that he never felt better in his entire life, nor more appreciative of good health.

Pollard Advanced by Standard

Standard of California has announced the appointment of C. A. Pollard as assistant general manager of the company's Richmond refinery. A Standard Oiler since 1921, Pollard has been at the Richmond refinery for the past 16 years, most recently as manager of the refining divisions.

C. W. Rehfuss, manager of service divisions at Richmond, becomes manager of the refining divisions. Rehfuss has been with the company for 22 years.

Glenn L. Cardwell, who formerly was identified with Signal Oil & Gas Co. operations in the Long Beach area, has been appointed production manager for the company at Santa Maria. Cardwell is making his home east of the Beacon sector adjacent to lease headquarters.

Charlie Cooper, known familiarly as "Catline Slim" during his active drilling days at Signal Hill and Santa Fe Springs, now is a prominent Los Angeles real estate operator.

Shamrock Drilling Co. (George McCarthy and J. J. O'Brien) has several strings of drilling tools in operation at Wilmington, Gato Ridge and other producing areas. The company was organized some years ago on St. Patrick's Day.

Feature of the recent meeting of the Santa Maria Oil and Gas Association in Santa Maria was the address by John Harold of the Baroid organization at Los Angeles on "Drill Pipe and Mud Use in Drilling."

South Mountain Try Runs Witch

Water witch is being run in D. D. Feldman's Richardson Estate No. 1 in Sec. 23-3n-21w in the South Mountain area, after the well made an estimated 100 barrels of gross oil a day, cutting 75 per cent. Total depth is 4676 ft., with plug at 4052 ft.

The United States now has 394 petroleum refineries.

Los Angeles Chapter of N.I.A.A. Elects Harry Howard

Industrial Advertising Association of Southern California, the Los Angeles Chapter of the National Industrial Advertisers Association at its regular election meeting in July selected the following officers and directors to guide the destiny of the organization during the coming year.

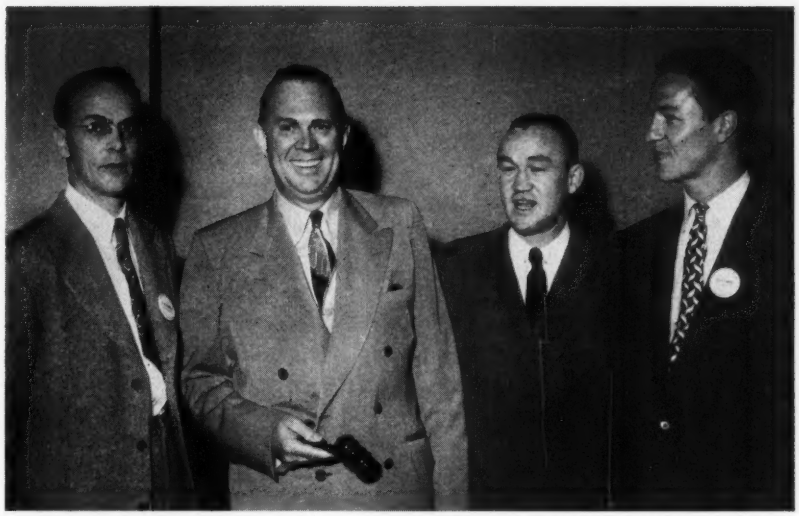
Harry Howard, Salsbury Motors, Pomona, president; A. X. Schilling, So. Calif. Edison Co., vice president; Bruce Lindeke, Advertising Management Service, secretary-treasurer; A. O. Dillenbeck, Duncan A. Scott Co., recording secretary.

Elected as N.I.A.A. directors of the Los Angeles Chapter were: B. P. Mast, Conover-Mast, senior member; Earl L. Taggart, McGraw-Hill, junior member. Selected to serve as directors of the I.A.A.S.C. were: Harry S. Rorick, Turco Products, Inc.; R. Calvert Haws, Western Precipitation Corp.; R. Raymond Kay, Iron Age; M. L. Gowans, Darwin H. Clark, Advertising.

Committee Chairmen who have been appointed by President Howard are: R. Payne Wettstein, Program; A. Byrd Christian, House; Forrest C. Pearson, Membership; Donald O. Hanson, Magazine; Davis E. Browne, Publicity; Clay H. Hollister, Jr., Reception; Theodore Schell, Bellringer.

These officers and directors were installed on August 15, 1946 at the regular monthly meeting. At the conclusion of the installation ceremonies, President Howard presented retiring President M. L. Gowans, with a Parker "51" pen and pencil set as an expression of appreciation from the members for the efficient and effective way that he directed the group during the past year.

Bill Pemberton takes no credit for catching the huge and voracious sailfish adorning the wall of his office in the Petroleum Building, Los Angeles. Unlike most fishermen of time immemorial, Bill explains that the denizen of the deep was brought to gaff by his good friend Elmer Boeseke, occupant of an adjoining office.



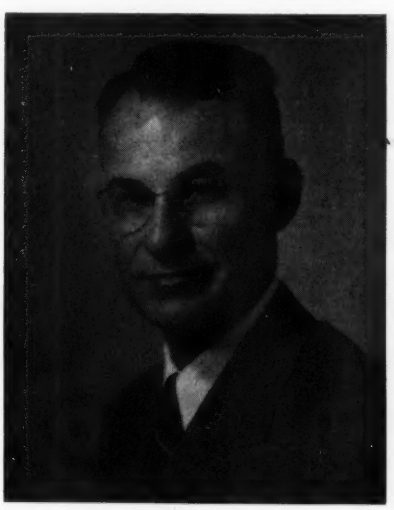
Industrial Advertisers Association of Southern California newly elected officers on installation day. Left to Right: A. X. Schilling, Southern California Edison Co., vice president; Harry Howard, Salsbury Motors, Inc., president; M. L. Gowans, Darwin H. Clark Advertising, retiring president; Bruce Lindeke, Advertising Management Service, secretary treasurer.

Powell Named President California Refining Co.

Fred Powell, recently named a Director of California Refining Co., has been appointed president of the company.

The new corporation was organized under the terms of an agreement now awaiting approval by the stockholders of Barber Asphalt Company. Standard of California and Barber will be stockholders of the new company, which will operate the latter's marine terminal and other facilities near Perth Amboy, New Jersey.

Powell, a graduate of the University of Washington, started his career in the petroleum industry in 1925, when he went to work for Standard at its Richmond refinery. Subsequently he held various posts at the company's Richmond, El Segundo, El Paso and Bakersfield refineries. He has been at the El Segundo plant since 1941.



Fred Powell

Rockwell Manufacturing Co. Appoints New Chief Engineer Of Pittsburgh Equitable Meter Division

E. R. Gilmore, who has been Chief Engineer of Emco products, has been appointed Chief Engineer of the Pittsburgh Equitable Meter Division of Rockwell Manufacturing Company.

Mr. Gilmore will be in charge of engineering and development of the meters and regulators built by the division for the control of gas, gasoline and oil.

He was graduated from Rensselaer Polytechnic Institute in 1920, and since that time has been engaged in work in the field of measurement and control. He joined the Pittsburgh Equitable Meter Company in 1936 and has guided the engineering and development of many new products, among them the new Rockwell-Emco Domestic Gas Meter.

Plain Old Mud GOES MODERN!

Mud was once a rough-neck's grief,
A necessary drilling trouble,
Hosed off with water
From slippery pipe,
Mud was sloshed
On rig floors
and *Lost!!*

Now, mud is a valuable "drilling fluid,"
Scientifically made and controlled.
Squeegeed off the drill pipe
And back into the hole
By Patterson-Ballagh
Drill Pipe Wipers,
It is *Saved!!*

CASE HISTORY NO. 11

Mud control was a major key to victory over one of the toughest California formations at Lost Hills, recently. By studying the records of previous deep test difficulties in this region, an exacting mud control program was laid out as the method of overcoming the problem. In attempting penetration of the pervious Temblor zone to reach the Eocene, it was necessary to combat great pressures and a high volume of hot salt water influx. Trying to balance great circulation loss in the Temblor against the possibility of the well blowing out of control had defeated many previous attempts. However, the predetermined mud program, carefully regulating mud viscosity, weight, and volume, enabled them to reach 11,080 feet in the Eocene, as planned.

The use of a drill pipe wiper, each time the pipe was pulled, to prevent mud loss and to aid in keeping the hole full of mud at all times was a definite part of the Mud Program.

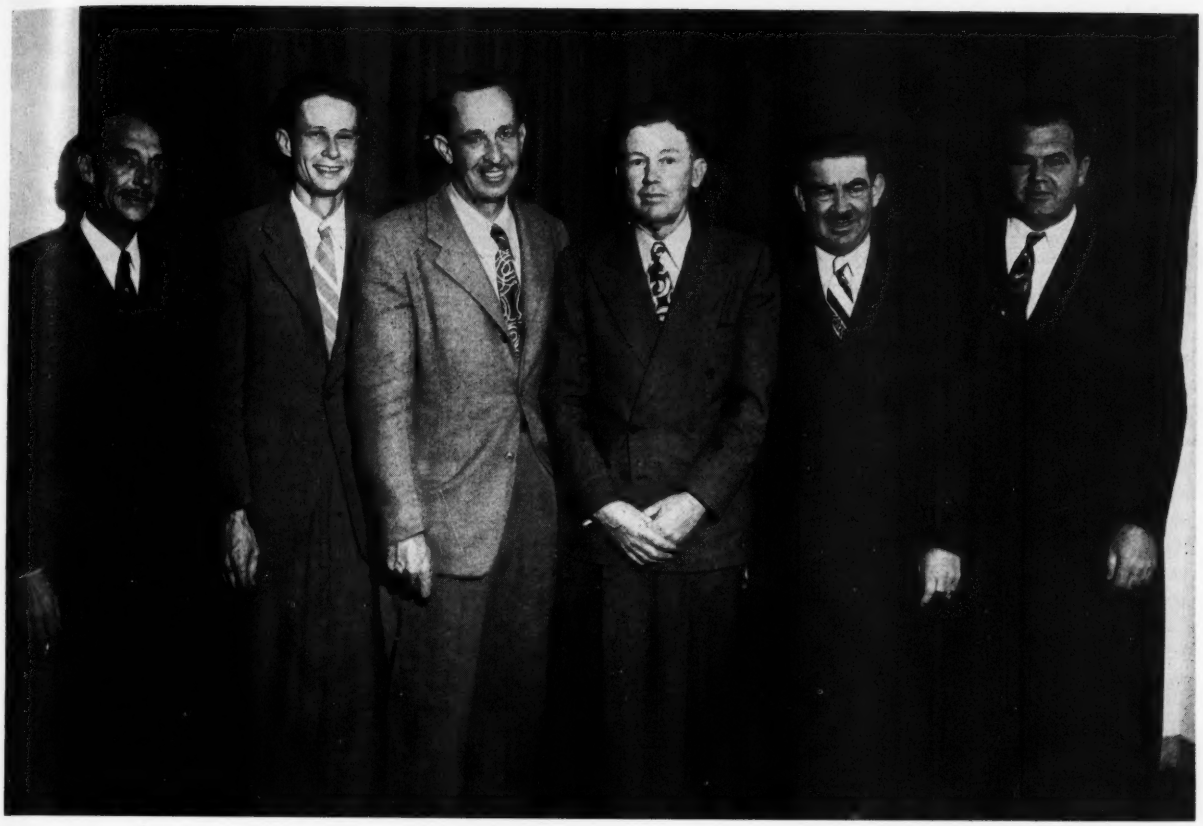
Patterson-Ballagh Pipe Wipers not only mean comfort to the crew. They are an important part in modern mud management for profitable drilling. There is a size and type for every need. Order from your Patterson-Ballagh man today!

Specify **PATTERSON-BALLAGH**

"Best Bet Yet"

DRILL PIPE & TUBING WIPERS

Main Office 1900 E. 65th St. LOS ANGELES 1 ★ 1506 Maury St. HOUSTON 10 ★ 92 Liberty St. NEW YORK 6 ★ 210 Post St. SAN FRANCISCO 8



Shown above are the Halliburton Oil Well Cementing Company management personnel in California. From left to right they are: Curtis Cross, formerly Asst. Superintendent at Bakersfield, and now Superintendent at Dhahran, Saudi Arabia; George R. Brown, Superintendent of Oil Base Drilling Fluid Dept.; Carl Hern, Superintendent of Testing; J. E. Lacy, Calif. Division Superintendent; B. W. Wheeler, formerly Asst. Superintendent in California, now resigned; H. E. Doane, Superintendent at Bakersfield.

Ray Moore, once a prominent member of the oil fraternity on the Pacific Coast, but now a producer of wide repute in New Mexico, Texas and Colorado, has been spending a vacation at Los Angeles and other Southern California points. Ray now makes his business headquarters in Santa Fe, New Mexico's most colorful and alluring metropolis.

A brilliant social event of the year was the wedding of Adele von Bibra and Hendrick Zwart. The bride is the daughter of Carl von Bibra, president of Exeter Oil Co., and Mrs. Von Bibra, Beverly Hills residents.

The bride attended Westlake School for Girls, Marlborough, the University of Chicago and University of California, Los Angeles campus. Her husband, son of Mrs. M. C. Zwart-van Randeratt, was a lieutenant in the Netherland Air Force for five years. He received his education at the Lyceum at Bandoeng in Java.

Ashley DeWitt, widely known producer and contract driller, who came to Los Angeles in 1922 from Lincoln, Nebraska, still holds a place in his heart for the Cornhusker state.

He and Mrs. DeWitt returned to Los Angeles September 9 from several weeks vacation at Lincoln, where they attended the annual State Fair, an event that has intrigued them ever since they were youngsters. The DeWitts have more than 200 relatives in and around the Nebraska capitol. Before coming west, Ashley was in the grain business.

A winner in the small boat class in the Pacific Coast regatta was none other than Richard (Dick) Fenton, guiding hand of the California Stripper Well Association at Los Angeles. Dick's boat won a trophy for the fastest time from Long Beach to San Diego. He keeps his yacht moored at Balboa.

The death of James Edwin Peck, 83, in Los Angeles marked the passing of one of California's most illustrious oil pioneers. He came to the West Coast by covered wagon train in the early 60's from his native Iowa. In 1900, with his brother, the late Earl Wellington Peck, he drilled a number of wells in the McKittrick-Taft area, later entering the real estate business in Los Angeles. On June 2 of this year, he and his wife, Mary, who survives him, celebrated their 50th wedding anniversary.

At one time, Earl Wellington Peck was vice president of the Wellington Oil Co., a Los Angeles concern. James Peck had resided for the last 40 years at 1630 South Union Avenue, Los Angeles. He leaves, in addition to his widow, four children and three step-children.

Globe Introduces New Bit

The Globe STS-2 Rock Bit is the latest addition to Globe's complete line of rotary drilling bits. The extra long cutter teeth by which this bit is identified are designed to drill efficiently and economically at maximum speed. By changes in design, additional circulation ports are provided to increase the washing action on all cutters and give adequate insurance that the bit will not "ball up" in any formation.

The "S-2" was first introduced in late 1945 without the publicity usually attendant upon new or re-designed products. Since its quiet inception it has steadily grown in popularity, and in thousands of runs has produced an enthusiastic response from drillers and tool-pushers in domestic and foreign fields.

Like all Globe Rock Bits, the design of the "S-2" allows ample cutter and shank clearance which assures free running and low torque. The reinforced construction of the bit body holds the cutter pins in exact alignment under the most severe twisting strains; prevents cutters from binding and running flat; reduces wear on bearings and pins; and prevents bit distortion under abnormal drilling loads.

Information regarding actual performance records of the new Globe "S-2" Rock Bit may be secured by writing to manufacturer: Globe Oil Tools Company, Los Nietos, California.

Tube Turns Now in Post War Stride

One of the most complete lines of stainless steel welding fittings to reach the postwar market is now being manufactured by Tube Turns (Inc.), Louisville, Ky., and is available through distributors located in all principal cities, it is announced by Jack Green, sales manager of the firm's Welding Fittings Division. The line includes 180° long radius returns, 90° long radius elbows, 45° long radius elbows, straight tees, reducing outlet tees, caps, eccentric reducers, concentric reducers, lap joint stub ends, laterals and crosses, all in standard and extra heavy weights; and welding neck flanges, slip-on flanges, threaded flanges, blind flanges, socket-type welding flanges, reducing flanges, orifice flanges and lap joint flanges. Sizes range from ¾" through 12".

The fittings may be had in three grades of stainless steel; Type 304, containing 18% chromium and 8% nickel; type 347, containing 18% chromium, 8% nickel, and approximately 1% columbian; and type 316, containing 18% chromium, 8% nickel and 2% molybdenum. Surveys conducted by Tube Turns' Engineer Service Department and other research groups indicate that these grades meet 95% of industry's standard requirements.

Pacific Public Service Lets Contract for Pipe Line

Pacific Public Service Company recently announced that a contract had been awarded to Pacific Pipeline Construction Company for the construction of a new natural gas pipeline system from a point near Pittsburg, California, to the Suisun Bay, Kirby Hill and West Rio Vista Gas Field, located in Solano County.

At present, Shell Oil Company and Standard of California have nine wells in the Kirby Hill-Suisun Area which are productive of natural gas, and a Pacific Public Service Company wholly-owned subsidiary has one productive well in the westside Rio Vista Field none of which is connected to a pipeline system.

The estimated cost of the line is approximately $900,000 and it is scheduled for completion this year. The line will have a capacity of approximately 65 million cubic feet per day.

The proposed line will be interconnecting with the Stanpac Pipe Lines which connect the Bay Area to Kettleman Hills and the East Rio Vista Field. Pacific Public Service Company is also the owner of 5/14th of the Stanpac Line.

The new line will make available additional gas for the fast-growing county of Contra Costa which is served by Coast Counties Gas and Electric Company, a subsidiary of Pacific Public Service Company.

Chiksan Buys "Weco"

Chiksan Company, Brea, California, announces the acquisition of The Well Equipment Manufacturing Corporation, Houston, Texas, through the purchase of all the Corporation's common stock. Operation of the Corporation will be continued as a wholly-owned subsidiary of Chiksan Company.

Oxnard Prospect Location Staked

Exeter Oil Co. has location staked for its Livingston No. 2 in Sec. 6-1n-21w in the Oxnard area. The drill site is near the intersection of Wolff and Sturges Sts.

New World's Record Set For a Successful Cutting Job

In what is believed to be the deepest successful cutting job on record, Shell Oil Company recently cut and recovered all but a fraction of a string of 3½" Grade "D" drill pipe at a depth of 14,601 feet. The fishing job occurred on Shell's Alamitos 48A well at Signal Hill, California, which was then drilling at 14,870 feet.

The pipe parted ten feet above the rotary table while coming out of the hole. Stands already removed accounted for 2,390 feet, the remaining 12,480 feet falling back to bottom. An impression block was run and showed that the portion of the tool joint remaining on the top of the fish was so badly egg-shaped that it would have to be milled off. This was the first operation performed in preparing the fish for recovery.

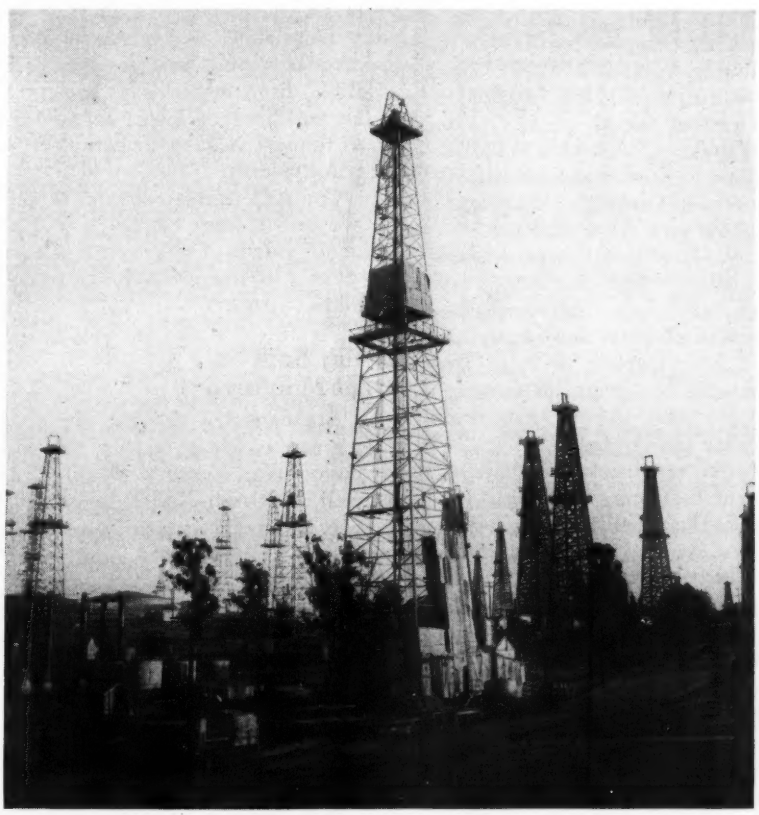
Next, a socket was run in an attempt to pull the fish and to break circulation. But the fish could not be loosened, so the socket was released and the fishing string withdrawn from the well. It was then decided to attempt to recover the fish by taking hold of it with a fishing string equipped with a Shaffer-Hamon Releasing Socket and then lowering a 2¼" O.D. Shaffer Internal Pipe cutter through this fishing string and the fish to cut the pipe. First cut made at 14,730 feet. The pipe cutter was run in on a string of 1.66" O.D. upset tubing and set in the fish at 14,775 feet. However, the kinked condition of the fish made rotation impossible at this point, and the cutter was raised to 14,730 feet. Rotation was begun with fifteen turns of torque on the tubing string, and most of this torque remained on the string during the entire process of cutting. The Cutter made a cut in the fish at 14,730 feet—probably the deepest cut ever made—and the tubing string and cutter were removed from the hole.

An attempt was then made to pull the fish and break circulation, using the Releasing Socket that was on the fishing string. A pull of 280,000 pounds was taken on the fish and high pressure applied with the pumps. At 4000 pounds pressure the packer in the Socket blew out, necessitating release and removal of the Socket for installation of a new packer. In spite of the tremendous pull that had been taken with the tool, it readily released from the fish when desired **without the use of a bumper sub.** The bumper sub usually run with fishing tools had to be left off in this case because of insufficient I.D. for lowering the cutting string through it. After renewing the packer the assembly was again run in the well to take a hold on the fish, and preparations for the second cut were begun.

On the second cutting attempt the 2¼" O.D. Internal Pipe Cutter was again run on the 1.66" O.D. upset tubing to a depth of 14,601 feet. Here the second cut through the fish was successfully made and the cutting string was again removed from the hole for subsequent pulling operations. This time the Socket packer successfully withstood a pump pressure of 5000 pounds which was applied in trying to break circulation, but no circulation could be obtained. However, continued working of the fish finally loosened it at the 14,601 foot cut and it was successfully pulled from the hole with the Socket. Several attempts were made to recover the balance of the fish but it was so badly stuck that the Shell Oil Company finally whipstocked past and resumed drilling from 14,601 feet.

Several noteworthy facts should be pointed out in connection with this job. For one thing, it is significant that the equipment used in cutting and pulling the fish on this job operated without difficulty at a depth of more than 2¾ miles. Also, even though a pull of 280,000 pounds was taken on the fish, the Socket was released without the use of a bumper sub. As explained above, no bumper sub was used because the cutter was run through the socket, and the limited I.D. of the bumper sub prevented its use. In addition, the Socket showed no crimping whatever of the pipe under the 280,000 pounds pull.

The successful completion of this cut-and-pull job by Shell Oil Company demonstrates the fact that modern fishing equipment and techniques are capable of operating under severe well conditions and at depths never before encountered in drilling work.



Shell's Alamitos 48A at Signal Hill.

White Truck Coast Head Reports on Conditions

Coast truck owners are thoroughly aware of the continued necessity for proper service and care of their equipment in the face of the prolonged shortage of new units. This fact was widely noted by Wilson D. Patterson, White Motor Company Regional Manager of the Pacific Coast, on an inspection trip recently made throughout his territory.

"It is obvious to all truck owners," said Mr. Patterson, "that it will be some time before new truck production can meet buyers' demands; so the old trucks which have been operating for so many years will have to be kept running still longer. This can be done economically only with a methodized system of maintenance—such as with the White Personalized Service Program."

In his three-week tour of White branches and distributors the regional manager declared himself to be greatly impressed by the improvements in service and facilities made during the past year. In Klamath Falls he visited the new building occupied by the White distributor, West-Hitchcock. Mr. Patterson also inspected expansion activities of the shops and parts departments of Murphy White in Seattle. He also met with new White dealers in Centralia, Aberdeen, Bellingham and Wenatchee.

"White's distributors, dealers and branches," Mr. Patterson pointed out, "are not content with the tremendous gains they made during the war toward proving the advantages to owners of dealing with people who are in a position to service the product they sell. These White representatives are going ahead — striving constantly to improve their facilities and make them the most outstanding in their particular communities."

The regional manager also called attention to the fact that complete White units — engines, transmissions, rear axles, etc.—are now available for replacement.

East Texas led all other oil fields in production in 1945 for the fourteenth consecutive year.

Hercules Broadens Activities in the Oil Industry

Hercules Motors Corp. of Canton, Ohio, announces the opening of a direct factory branch on the West Coast, and the appointment of distributors for various industries using their lines.

The H & B Sales Company of 2875 Cherry Ave., Long Beach have been appointed oil industry distributors.

Headquarters of the factory branch is located at 2065 E. 37th St., where warehouse facilities have been built to assure distributors of ample stocks.

Mr. W. W. Cromley is Vice-President in charge of Coast operations, and he is assisted by Mr. Herbert Wirshing, Mr. Oliver Kelly and Mr. Walter Batty.

City of Albany, Georgia To Install Propane Air Gas Plant

A contract has been awarded to Stacey Dresser Engineering of Cleveland, Ohio, Division of Stacey Bros. Gas Construction Company, of Cincinnati, Ohio, for the design and installation of a propane-air gas plant.

This plant will produce 312,000 standard cubic feet per day of 550 BTU propane-air gas and is designed at other lower capacities so as to meet variable peak winter load requirements.

Complete unloading and liquefied propane storage facilities will also be provided. The generating equipment will include a BTU recorder and controller.

Rig Built At Montalvo

Standard Oil Co. has rig up for its new wildcat test in the Montalvo area, Ventura County. The well, McGrath No. 2, is located in Sec. 26-2n-23w.

McKittrick Well Rigging Derrick

General Petroleum Corp. is rigging to initiate drilling in its Hall-Baker No. 66-4, a prospect job in the McKittrick area in Sec. 4-30s-21e.

Twenty-five new oil pools were opened in West Texas in 1945.

Richfield Adds Los Angeles Wells

Richfield Oil Corp. has completed new producers in the East Los Angeles field. Edison No. 1 in Sec. 16-2s-12w was finished at a redrilled bottom at 7980 ft., flowing 649 barrels of 37.4 gravity oil on a 15-hour gauge, along with a high gas yield. Vail No. 2 in the section was finished on the pump at 9238 ft. for 143 barrels daily of 34.4 gravity oil.

The U. P. Unit No. 2 in Sec. 8-2s-12w is coring at 8000 ft. Flood Control No. 1 in Sec. 14 is drilling at 4150 ft. Boyle Comm. No. 33-1 in Sec. 31-1s-1w is rigging up.

Kraemer Well Flows Hot Water

G. D. Murdock's Howell No. 1 test in Sec. 1-4s-9w in the Kraemer area of Orange County has been converted to an artesian hot water well at 820 ft. The try was abandoned as an oil failure after looking at all formations down to a total depth of 4508 ft.

Mountain View Well Gets Deep

L. S. Gilmour & Assoc., Thornber No. 83 in Sec. 14-30s-28e in the Mountain View is making hole ahead in sand and shale at a depth of 4867 ft. On the Di Giorgio Ranch in the Arvin sector, Western Gulf Oil Co. is drilling No. 1 in Sec. 10-31s-29e at 780 ft. On formation test of Union Oil Co.'s Di Giorgio No. 71 in Sec. 3-31s-29e, recovery was mostly gassy mud. Gas blow was good. Total depth is 4540 ft. in oil sand, top of which is placed at 4505 ft.

Associated Oil Valley Explorer

Tide Water Associated Oil Company's Tupman No. 43-9 explorer in Sec. 9-31s-29e in the Arvin area is drilling at 5400 ft. Site is being graded for Midway-McKittrick No. 5-32 in Sec. 32-30s-22e.

Of the 53 fields in the United States which have produced 100 million barrels or more of oil, 19 are in California, 14 in Texas, 13 in Oklahoma, 2 each in Louisiana and Illinois, and 1 each in Arkansas, New Mexico, and Wyoming.

THIS LAUGH

OFF!!

An Arkansas hillbilly built a house for his wife in which he fashioned windows but no doors. "Where are the doors?" asked the nervous bride.

He drew himself up to his full height and replied: "Door? Are you going somewhere?"

In a small fight club the fans were disgusted with the lack of action in the ring. The two battlers did nothing but circle each other, with no punches being thrown. A forbidding silence mounted in the arena. Then—

"Hit him now, you bum," a spectator called. "You got the wind with yah!"

A minister making a call was sitting in the garden with his hostess, when her little boy rushed toward them holding a rat above his head. "Don't be afraid, mother, it's dead. We beat him and bashed him until" —and then catching sight of the clergyman, he added in a lowered tone—"until God called him home."'

First Communist: Nice weather we're having.

Second Communist (grudgingly): Yes, but the rich are having it, too.

Hilda: "Why did you give that comedian the air?"

Marge: "Because every time I went out with him, he tried to get funny."

"Why did you leave your girl's house so early?"

"Because we were sitting on the sofa, and she turned out the light. Guess I can take a hint!"

Little Willie, unafraid,
Monkeyed with a hand grenade;
Mother, at the morgue, complained:
"Willie sure is scatter-brained!"

Doctor: "You must avoid all forms of excitement."

Bill: "Can I look at them on the street?"

We hope you haven't forgotten the little farm girl who always went out with city fellers because the farm hands were too rough.

Mother: "Do you like your new governess, sonny?"

Son: "No, Mom, I hate her. I'd like to grab her and bite her on the neck like Daddy does."

There was a girl known to her intimates as "Bacon"—somebody was always trying to bring her home!

She: "Sometimes my father takes things apart to see why they don't go."

He: "So what?'"

She: "So you'd better go."

A Chinese gentleman was trying to catch a train at the Union Station recently, and Porter Eddie Buck was trying to locate his baggage. The Chinaman got very upset. Finally, as the train was about to depart the Chinese gentleman hammered upon the counter and exploded in these words:

"Pretty damn seldom where my bag go. She no fly. You no mort fit run station than God's sake. That's all I hope."

Prof. Tilt: "Mr. Gray, what three words are used most among college students?"

Gray: "I don't know."

Prof. Tilt: "Correct."

Head Clerk: "Did you hear the ladder fall, Joe?"

Clerk: "Yes; I hope the boss didn't fall, too."

Head Clerk: "He hasn't yet. He's hanging to the top shelf."

Wile Cat: "When I wuz born, I jis' weighed two pounds, an' I was jis a foot long."

"Gosh! Dija live?"

"Sure. You oughta see me now."

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Washington Highlights

(Continued from Page 1)

through 29-year classes will be relatively small.

Members of the inter-agency committee of the Interior Department's new oil and gas division have been announced. The agency is designed to coordinate various petroleum activities under the chairmanship of the director of the group.

Appointment for the State Department is Charles B. Rayner, petroleum advisor to the Secretary of State; War, Colonel Gus H. Vogel, executive officer of the Army-Navy Petroleum Board and director of fuels and lubricants for the Office of Quartermaster General; Navy, Captain B. B. Briggs, deputy executive officer, Army-Navy Petroleum Board; Federal Power Commission, Nelson Lee Smith, vice chairman and supervisor of the natural gas investigation; and Civilian Production Administration, Raymond E. Kerr, director of transportation and fuels.

"Arsenal of Democracy," a book written by Donald M. Nelson, former chairman of the War Production Board, and just published, is an unsparing criticism of conduct of the military during the war. The tome, which set official circles in Washington buzzing, charged that in the war years the Army tried to "gain control of our national economy." These aims, he wrote, almost succeeded in 1944 and consequently hindered the reconversion program.

Emphasizing that the War Department from now on will be "one of the most powerful and influential branches of our Government," Nelson warned that the country's whole economic and social system will be jeopardized if it is controlled by military men.

South Mountain Job Scheduled

Ring Oil Co. is planning a return to the South Mountain area of Ventura County, after an absence of 25 years. In 1923 the company drilled a test with cable tools to 5000 feet without commercial success.

Subsequent events indicate that the company was nearer to success at that time than realized. Freeman Fairfield recently finished a well in the immediate area on the Converse property for an oil yield from 5154 ft. Considering a difference of 30 ft. in elevation, Fairfield travelled only 184 ft. deeper than Ring did in the early days.

Ring's forthcoming drilling job will go down on a 40-acre parcel owned in fee in Sec. 23-3-21. Holdings of the Ring organization in the area at one time approximated 2000 acres. The Ring parcel is about 300 ft. south of the Fairfield well. Los Nietos Co. current job is an offset to both the Ring location and the Fairfield producer.

Ring Oil Co., headed by two of the petroleum industry's most popular members—George and Frank Ring—is represented in all oil centers of California with extensive properties, particularly at Poso. Holdings are also large at Signal Hill, Santa Fe Springs and Wilmington.

Camarillo Test Grading Ground

Roads are being graded for Texas Co., Broome No. 1 wildcat test in Sec. 29-1n-20w in the Camarillo area of Santa Barbara County. Contract was let to Modern Drilling Co.

Sheep Springs Well Completed

Flowing initially an estimated 400 barrels of 20 gravity crude oil through a one-inch orifice, Texas Co. has given the finishing touches to its Anderson No. 1 in Sec. 20-29s-21e in the Sheep Springs area at a total depth of 2863 ft. A Carneros producer, this zone was topped at 2726 ft.

The company's designated 8000-ft. Eocene test in the McKittrick area, West Pet. No. 1 in Sec. 29-30s-22e, is running surface casing, with hole bottomed at 500 ft. On the McDonald anticline, Theta No. 2-1 in Sec. 2-28s-19e is idle at 850 ft.

Tip Top Job Digs Deeper

L. M. Lockhart, veteran oil marketer and producer, is drilling Macrate No. 1 test in Sec. 27-4n-23w in the Tip Top area, Ventura County, at a depth of 5717 ft. in Mudrock. Top of this formation was placed at 4760 ft.

Shell Rigging Ten Section Try

One of the most interesting tests in prospect in Kern County is Shell Oil Co., Inc., K.C.L.-A No. 53-30 deep test in Sec. 30-30s-26e in the Ten Section field. Stevens sand is the present production source in the field.

Sheep Springs Well Grading

Miller and York are grading well site for Richardson No. 1 in Sec. 18-29s-21e in the Sheep Springs area. Location falls 420 ft. north and 350 ft. east of the center of the section.

San Emigdio Try Drills Brown Shale

In the San Emigdio area of Kern County, Western Gulf Oil Co. is making steady progress with the drill at a depth of 1460 ft. with its San Emigdio No. 3 in Sec. 31-11n-22w. Present formation is brown shale. Contractor is O'Kane & Brain.

Turk Anticline Try Builds Rig

Rig is up for Superior Oil Co.'s K.C.D. No. 1 wildcat in Sec. 13-17s-16e in the Turk Anticline area of Fresno County. Elevation is 266 ft.

This ground long has intrigued the interest of geologists, but is yet to be proved up. Previous tests in the area found showings below commercial standards.

Mountain View Well Drilling

Cleveland Oil Co., which recently completed its Ten Eyck No. 1 as a substantial producer, is drilling No. 2 in Sec. 29-30s-29e in the Mountain View area at 3200 ft.

Belridge Offset Project Staked

General Petroleum Corp. has location staked for a drilling job in Sec. 10-29s-21e in the South Belridge area. The venture will search for oil in the Hopkins oil sand, a sand producing below the upper Belridge. The well is an offset to the substantial producer recently completed by Union Oil Co. on the Marina ground.